



EU-ASIA DIALOGUE

*Shaping a Common Future for Europe and Asia –
Sharing Policy Innovation and Best Practices in Addressing Common Challenges*

Eco-Cities

**Sharing European and
Asian Best Practices
and Experiences**



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Best Practices and Experiences



Konrad
Adenauer
Stiftung

EAI
EAST ASIAN INSTITUTE
NATIONAL UNIVERSITY OF SINGAPORE



EU Centre in Singapore

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Towards Eco-cities in Europe and Asia— Sharing of Best Practices and Experiences: An Introduction

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ECO-CITIES AND SUSTAINABLE URBAN MANAGEMENT

Global warming and climate change issues require actors such as governments, public and private organizations, non-governmental organizations, local communities and even individuals to undertake more concerted action to better organize economic and social activities, particularly for those living in crowded urban areas. The traditional emphasis has been on the single-minded pursuit of ever-higher economic growth with scant regard for environment protection and social considerations. Such a one-sided orientation is no longer tenable as global warming and climate change are already affecting the way we live, work and play.

Cities, the world over, continue to grow and expand because of their attractive amenities and the abundant economic and social opportunities they offer. By providing access to these opportunities, cities have allowed people to improve their living standards and move up the social ladder. At the same time, as hubs of prosperity, cities also have to grapple with a host of problems such as over-crowding, traffic congestion, slums, illegal settlers, pollution, water shortages, high energy consumption and large waste generation.

Apart from the challenges cited above, it is also important to bear in mind that not all cities are as well-equipped or ready to handle the expected increase in urban population. In many of these cities, especially in the developing countries, there are additional issues, such as poor governance, weak institutions, fragmented coordination structure, poor planning, insufficient financial resources and lack of trained manpower, that hobble the ability of these cities to cope with further population increase. There is thus an equally important and urgent need to focus attention on improving the capacity of these cities to cope with a larger population.

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According to the United Nations (UN), much of the population growth in the urban areas in the future will be concentrated in the cities and towns of the less-developed regions. By 2007, half of the world's population was already living in cities. Between 2011 and 2050, the UN estimates that the world's population will increase by 2.3 billion, rising from 7 billion to 9.3 billion. At the same time, the increase in population living in urban areas is projected to exceed 2.6 billion, rising from 3.6 billion to 6.3 billion. In other words, the urban areas of the world are expected to absorb all the population growth expected over the next four decades. More importantly, most of the population growth expected in urban areas will be concentrated in the cities and towns of the less-developed regions.² In particular, Africa and Asia will experience a marked increase in their urban populations. In Africa, the urban population is likely to treble and in Asia it is expected to increase by 1.7 times.³ Based on these projections, it is even more imperative for Africa and Asia to find ways and means to better plan the growth of their cities to take into account not only economic growth but also other environment and social considerations.

One important avenue to meet this objective is to promote the development of eco-cities so that these cities can continue to thrive and grow, while at the same time take into account the need to protect the environment through ways such as improving resource use and reducing waste output. In other words, the high density of cities need not necessarily be a bane. Instead, the high density of cities can bring about efficiency gains and technological innovation that produces a lower carbon footprint. All stakeholders have a role to play to shape our cities so that everyone can enjoy a decent, if not good, quality of life.

In this introduction, the term eco-city is used generally to refer to cities with eco-friendly features and practices that are built from scratch (i.e., green field projects) or to existing mature cities that adopt eco-friendly features and practices either through expansion or retrofitting of existing projects.

FROM GARDEN CITY TO ECO-CITIES

Although the term eco-city came into formal use in the 1970s, the ideas and concepts related to planning and building our cities in a more sustainable, efficient and liveable manner by taking the environment into account have been areas of interests for scholars, practitioners and activists well before this time period. As early as 1898, a British urban planner by the name of Sir Ebenezer Howard initiated the "Garden City Movement" that promoted the concept of garden cities comprising planned and self-contained communities surrounded by greenbelts such as forests and water features with carefully balanced areas of residences, industry, and agriculture. His book *To-morrow: a Peaceful Path to Real Reform*, first published

² "World Urbanization Prospects: The 2011 Revision", United Nations Department of Economic and Social Affairs/Population Division, Released in 2012, p. 1, available at http://esa.un.org/unpd/wup/pdf/WUP2011_Highlights.pdf (accessed 21 November 2013).

³ *Ibid.*, United Nations Department of Economic and Social Affairs/Population Division, pp. 11-12 (accessed 21 November 2013).

in 1898 and then re-printed in 1902 as *Garden Cities of To-morrow*, was a pioneering work on urban ecological development and provided a basis for the evolvement of the later “eco-city” concept.

Across the Atlantic Ocean, at around the same time period, American architect Daniel Burnham best exemplified the “City Beautiful Movement” (as a reaction to overcrowding in tenement districts) when he oversaw the design and construction of the World’s Columbian Exposition in Chicago in 1893, which showcased a city with monumental buildings linked by roads. Burnham went on to initiate the “The Plan of Chicago” in 1906 that outlined a plan for the development of this American city. At the centre of the plan was a French-inspired monumental municipal building with other buildings, boulevards and water features radiating from it. This plan set the standard for the urban design of other American cities.

In the mid-1970s, following the first oil crisis, Urban Ecology, a US Berkeley-based non-profit organization, was established to address the importance of compact urban planning structure and various city planning approaches in conserving energy and minimizing the use of other resources. This organization coined the term “eco-city”.

More specifically, it was Richard Register, founder of Urban Ecology, who observed in his influential book *Ecocities: Building Cities in Balance with Nature* that people have been trying to build cities in balance with nature all along but have continually been led astray. In Register’s view, for cities to function efficiently, distance is critical. He advocates more density at closer proximity, because when the distance between destinations (i.e., between people who interact and processes that consume inputs and generate outputs) goes up, so does energy use, waste, and land-use or what it commonly known today as the “carbon footprint”. He further describes what an eco-city should look like in terms of its layout, structure, transportation networks, energy use, water management, manufacturing and economic structure and food production.⁴

David Engwicht further enriched the study of eco-cities with his publication *Towards an Eco-City: Calming the Traffic*, where he illustrates how city planners and engineers have virtually eliminated exchange space (that includes homes, community halls, parks, work places and shops essential for human interaction) by building more movement space (that includes roads, car parks and train tracks). For Engwicht, a city is “an invention for maximizing exchange and minimizing travel”. He uses exchange to refer to various sorts of activities that includes goods, money and ideas. He calls for eco-cities where people can move and interact freely on foot, bicycles and mass transit without fear of traffic and toxins.⁵

Mark Roseland has acknowledged that Register, Engwicht and Urban Ecology certainly deserve credit for popularizing the term “eco-city”. At the same time, Roseland notes that the eco-city concept is strongly influenced by other movements that were developing over the same period as Urban Ecology as well as by a long line of thinkers and writers whose ideas were precursors to these concepts many decades ago. He cites several paradigms or moments that have influenced and defined the various dimensions of eco-city concepts, such as

⁴ Richard Register, *Ecocities: Building Cities in Balance with Nature* (Berkeley, USA: Berkeley Hills Books, 2002).

⁵ David Engwicht (1992). *Towards an Eco-City: Calming the Traffic* (Sydney, Australia: Envirobook, 1992).

appropriate technology, community economic development, social ecology, the green movement, bioregionalism and sustainable development.⁶

Apart from the work of individual scholars and experts, there was also growing worldwide concern over declining ecological trends and the increasing need to find a balance and integrated approach to development and environmental questions. In December 1983, the United Nations Secretary General, Javier Perez de Cuellar, responded to a UN General Assembly resolution by appointing Norwegian Prime Minister Gro Harlem Brundtland as Chair of the World Commission on Environment and Development. Over the next few years, the Brundtland Commission (as it became known) gathered, studied and analyzed the views of individuals, governments and other organizations spanning five continents. In its report, titled “Our Common Future”, published in 1987, the commission defined sustainable development as meeting the “needs of the present without compromising the ability of future generations to meet their own needs”.⁷ The commission’s work, underpinned by the principle of sustainable development, was significant in that it lent international political credibility to a concept which many others had worked on previously in a rather compartmentalized fashion.

The Brundtland report provided the momentum for the landmark Agenda 21 that emerged from the United Nations Conference on Environment and Development held in 1992 in Rio de Janeiro, Brazil. This conference came to be widely known as the Rio Summit (after the city where it was held) or the Earth Summit. Agenda 21 has 40 chapters that set out actions with regard to the social and economic dimensions of sustainable development, conservation and management of natural resources, the role of major groups, and means of implementation. According to its drafters, Agenda 21 “reflects a global consensus and political commitment at the highest level on development and environment cooperation”. Its successful implementation is first and foremost the responsibility of governments where national strategies, plans, policies and processes are crucial in achieving this (with supporting and complementary roles played by other actors such as international, regional and sub-regional organizations as well as non-governmental organizations).⁸

Within each country, Agenda 21 further recognizes the crucial role played by local authorities in constructing, operating and maintaining economic, social and environmental infrastructure, overseeing planning processes, establishing local environmental policies and regulations, and assisting in implementing national and sub-national environmental policies. As the level of governance closest to the people, the local authorities play a vital role in educating, mobilizing and responding to the public to promote sustainable development.⁹ Agenda

⁶ Mark Roseland, “Dimensions of the eco-city” in *Cities*, vol. 14, no. 4, 1997, pp. 197-202.

⁷ “Report of the World Commission on Environment and Development: Our Common Future”, United Nations, 1987.

⁸ “Agenda 21”, *United Nations Conference on Environment and Development*, Rio de Janeiro, Brazil, 3-14 June 1992, p. 3, available at <http://sustainabledevelopment.un.org/content/documents/Agenda21.pdf> (accessed 10 February 2014).

⁹ *Ibid.*, p. 285.

21 has been reaffirmed and further elaborated on at subsequent UN conferences, including the Rio+5 (1997), Rio+10 (2002) and Rio+20 (2012).

At the institutional level, the main task of working towards sustainable urban planning at the global level is undertaken by key bodies such as the UN Habitat and the United Nations Environment Program (UNEP). In particular, these two bodies jointly launched the Sustainable Cities Programme (SCP) in the early 1990s to build capacities in urban environmental planning and management. The programme targets urban local authorities and their partners. It advocates a broad-based stakeholder participatory approach. The first phase of the SCP concluded in 2001, and the second phase ran from 2002-2007. At present, the SCP and its sister program Localizing Agenda 21 (LA21) operate in over 30 countries worldwide.¹⁰ As mentioned in the above paragraph, Agenda 21, when it was first conceived in 1992, recognized the crucial role that local governments play in implementing sustainable development. Hence, the name LA21.

LA21, a key area of focus of UN Habitat, aims to help local authorities in secondary cities and towns (which often lack the competencies needed to address their evolving environmental problems) to achieve more sustainable development by implementing an environmental planning and management process to identify and address priority issues. By helping local authorities to implement demonstration projects and improve their capacities to deal with priority urban environmental issues, LA21 responds directly to the challenge of the Millennium Development Goals, and particularly Goal 7, Target 11, which seeks to improve the lives of 100 million slum dwellers by the year 2020.¹¹

In all, the growing worldwide and national attention and urgency paid to sustainable development that also includes building eco-cities is indeed heartening. At present, there does not appear to be a lack of ideas, theories, concepts or approaches in building eco-cities. Where there is much room for improvement would seem to lie in designing the move from “theory to practice”, with more emphasis on carrying out the practice part. In other words, there needs to be more committed on-the-ground action in building eco-cities.

PUBLICATION PURPOSE

To facilitate the move from “theory to practice”, the purpose of this book is to share the experiences and expertise of both Europe and Asia in building eco-cities. The conventional wisdom is that Europe has much to share and Asia has much to learn when it comes to building eco-cities. Such a view appears to be borne out by the vast literature on the experiences and practice (including achievements and challenges) of building eco-cities in the more-developed

¹⁰ “Sustainable Cities Programme”, UN Habitat Website at <http://www.unhabitat.org/content.asp?typeid=19&catid=540&cid=5025> (accessed 10 February 2013).

¹¹ “Localizing Agenda 21”, UN Habitat Website at <http://www.unhabitat.org/content.asp?cid=5023&catid=540&typeid=19&subMenuId=0> (accessed 10 February 2013).

countries, which includes the countries in Europe,¹² the US,¹³ Canada¹⁴ and Australia.¹⁵ Only some of them are highlighted here as they are too numerous to name.

The primary reason for such voluminous literature is due to the development head-start that the developed countries, including those in Europe, have enjoyed over their counterparts in Asia. Many European countries, which have already attained a certain level of socio-economic growth, are much more conscious of the negative impact of unbridled economic activities on the environment and have taken steps to mitigate this impact. Hence, a primary preoccupation of politicians, policy-makers, non-governmental organizations, academics and even individuals in these countries is to champion and sustain quality growth, i.e., growth that balances the requirements of the environment and other considerations such as social and cultural needs. Even businesses in these countries have internalized green practices and green standards in their operations to stay ahead of the competition.

To be sure, Western authors have also looked at eco-cities or eco-friendly projects in Asia but these seemed to be generally written within the context of their examination of eco-cities or eco-friendly projects in the developing world, which also includes some countries of Asia. For example, in *Designing Sustainable Cities in the Developing World*, Roger Zetter and Georgia Butina Watson examine various case studies in the developing world that included Mexico, South Africa, Brazil, Saudi Arabia, Bethlehem-Palestine and Bijapur (India).¹⁶ India is the only Asian country included in the study. In *Compact Cities: Sustainable Urban Forms for Developing Countries*, Mike Jenks and Rod Burgess discuss compact cities in the context

¹² Voula Mega, *The Desirable Future of Innovative Cities: Cities in Harmony with Nature, People and Society* (Verlag: Lambert Academic Publishing, 2011); Peter Clark (ed.), *The European City and Green Space: London, Stockholm, Helsinki and St. Petersburg, 1850-2000* (Aldershot, England: Ashgate Publishing, 2006); Uwe Altröck (ed.), *Spatial Planning and Urban Development in the New EU Member States* (Aldershot, England: Ashgate Publishing, 2006); Alan Hooper and John Punter (ed.), *Capital Cardiff 1975-2020: Regeneration, Competitiveness and the Urban Environment* (Cardiff: University of Wales Press, 2006); Julian Hunt (ed.), *London's Environment: Prospects for a Sustainable World City* (London: Imperial College Press, 2005); Niamh Moore and Mark Scott (ed.), *Renewing Urban Communities: Environment, Citizenship and Sustainability in Ireland* (Aldershot, England: Ashgate Publishing, 2005); Chris Holmes, *A New Vision for Housing* (New York: Routledge, 2005); C. A. Fletcher and T. Spencer (ed.) *Flooding and Environmental Challenges for Venice and its Lagoon* (Cambridge: Cambridge University Press, 2005); Chris Couch, *City of Change and Challenge: Urban Planning and Regeneration in Liverpool* (Aldershot, England: Ashgate Publishing, 2003).

¹³ John M. Levy, *Contemporary Urban Planning* (New Jersey: Pearson Prentice Hall, 2009); Christopher B. Leinberger, *The Option of Urbanism: Investing in a New American Dream* (Washington D. C.: Island Press, 2008); Douglas R. Porter, *Managing Growth in America's Communities* (Washington D. C.: Island Press, 2008); and, Rob J. Krueger and David Gibbs, *The Sustainable Development Paradox: Urban Political Economy in the United States and Europe* (New York: Guilford Press, 2007).

¹⁴ Luigi Ferrara and Emily Visser (ed.), *Canada Innovates: Sustainable Building* (Toronto: Key Porter Books, 2008); and, Patrick M. Condon, *Sustainability by Design: A Vision for a Region of 4 Million* (Vancouver, B. C.: Design Center for Sustainability, 2006).

¹⁵ Timothy Beatley and Peter Newman, *Green Urbanism Down Under: Learning from Sustainable Communities in Australia* (Washington D. C.: Island Press, 2008).

¹⁶ Roger Zetter and Georgia Butina Watson (ed.), *Designing Sustainable Cities in the Developing World* (Aldershot, England: Ashgate Publishing, 2008).

of developing countries that included Colombia, Brazil, Egypt, Chile, South Africa, China (covering case studies on mainland China, Hong Kong and Taiwan), India and Thailand.¹⁷ In these studies, Asia is not seen on its own merits alone but as part of the developing world.

Increasingly, however, there appears to be greater interest by scholars (which includes Asian authors either working alone or in collaboration with Western authors) who look at eco-cities or eco-friendly projects either from the Asian perspective or dwell on Asian examples. Most of such literature tends to focus either on the strategic significance of building sustainable cities in Asia or on examples in the more prominent developing countries such as mainland China (covering case studies on the mainland and Hong Kong)¹⁸ and India.¹⁹ Such growing interest can be attributed to the large and growing population in the urban areas in these two big Asian countries which will have significant environmental implications. In many cities in India and China, the national and local authorities have to contend with a large and sudden influx of new arrivals from the rural areas. This has given rise to the concept of mega-cities, proportionately much bigger than traditional cities. Given this phenomenon, the sort of high-density eco-friendly living with various amenities close by seemed a plausible way to work towards. In these cities, the need to quickly accommodate such a huge population influx might throw up some innovation in planning and managing the growth of such cities that might provide interesting lessons of experience for the reference of their counterparts elsewhere, including Europe.

In addition, while discussing Asia, it is worth noting that countries like Japan and South Korea have been at the forefront of building eco-cities and have vast experience and insights

¹⁷ Mike Jenks and Rod Burgess, *Compact Cities: Sustainable Urban Forms for Developing Countries* (London: Spon Press, 2000). Another author, Steven A. Moore, examines alternative routes to the sustainable city by conducting in-depth study into three cities, namely Austin (Texas), Curitiba (Brazil) and Frankfurt (Germany). No Asian city is mentioned in his study. See Steven A. Moore, *Alternative Routes to the Sustainable City* (Lanham: Lexington Books, 2007). Yet another book by Garth Andrew Myers takes a critical look at the issues of refuse disposal and sustainable development in three cities, namely, Dar es Salaam (Tanzania), Zanzibar (Tanzania) and Lusaka (Zambia). See Garth Andrew Myers, *Disposable Cities: Garbage Governance and Sustainable Development in Urban Africa* (Aldershot: Ashgate Publishing, 2005).

¹⁸ Adrian Pitts and Liao Hanwen, *Sustainable Olympic Design and Urban Development* (New York: Taylor and Francis, 2009); Kristen A. Day (ed.), *China's Environment and the Challenge of Sustainable Development* (Armonk: M.E. Sharpe, 2005); and, Leon Van Schaik, *Ecocells: Landscapes and Masterplans* (Chichester, West Sussex, England: Wiley-Academy, 2003).

¹⁹ Archana Rrasad (ed.), *Environment, Development and Society in Contemporary India: An Introduction* (Delhi: Macmillan, 2008); Rajendra Pachauri, *Coping with Climate Change: Is Development in India and the World Sustainable* (Canberra: Research School of Pacific and Asian Studies, Australian National University, 2007); Amitabh Bhatnagar, *Successful Experiments in Rural Development/Livelihoods: Sage and Sound Recipes* (Bhopal: Madhya Pradesh Rural Livelihoods Project, State Livelihoods Forum and Zenith Books International, 2007); Srikumar Chattopadhyay and Richard W. Franke, *Striving for Sustainability: Environmental Stress and Democratic Initiatives in Kerala* (New Delhi: Concept Publishing, 2006); and, Binayak Ray, *India: Sustainable Development and Good Governance Issues* (New Delhi: Atlantic Publishers, 1999).

to share on this topic.²⁰ Singapore is another country that, even prior to its independence in 1965, and well before the concept of eco-cities was popularized, had incorporated the green agenda into its city planning.²¹ Among one of the early initiatives to transform Singapore into a garden city, then Prime Minister Lee Kuan Yew launched the first Tree Planting Campaign in 1963. This was followed by the Garden City campaign in 1967. Beginning in 1971, an Annual Tree Planting Day was initiated in the first week of November.²²

Peter Newman and Anne Matan observe emerging innovations and the first signs of green urbanism in Asia and suggest that they might constitute a “guiding light” for the rest of the world. The authors highlight seven archetypal cities that exhibit green urbanism: the renewable energy city, the carbon-neutral city, the distributed city, the biophilic city, the eco-efficient city, the place-based city and the sustainable transport city. Under each type of cities, the authors cite Asian examples from China, India, Japan, South Korea, Indonesia and Singapore where eco-friendly elements and practices are being implemented and have so far delivered promising results. To them, these examples suggest that the cities of Asia instil hope that a greener urban future is possible.²³

Therefore, instead of a one-way street where Europe “teaches” Asia how things are being done, this book advocates a two-way street where the experiences and expertise of building eco-cities in Europe and Asia can be illuminating for both parties. In this way, there can be more grounds for sharing and it might even open up possibilities for mutually beneficial co-operation in building eco-cities between Europe and Asia. There might also be more grounds for promoting collaboration within the countries of each continent.

The second purpose of this book is to advocate an open and inclusive approach to the building of eco-cities. An eco-city can be a green-field project where everything is built from scratch. Such a project would have physical infrastructure in place that already meets certain environmental standards. An eco-city project can also involve piecemeal approaches where residents in a city or local community are given incentives or find that it is in their interest to adopt eco-friendly innovations or practices. Over time, these eco-friendly practices become internalized and a part of residents’ lives. Whatever the approaches taken to build eco-cities, they would most likely involve a reference to existing international best practices that are adapted to local conditions.

²⁰ Andre Sorensen and Carolin Funck (ed.), *Living Cities in Japan: Citizens’ Movements, Machizukuri and Local Environments* (New York: Routledge, 2007); and, Hidenori Tamagawa, *Sustainable Cities: Japanese Perspectives on Physical and Social Structures* (New York: United Nations University Press, 2006).

²¹ Wong Tai-Chee, Belinda Yuen and Charles Goldblum, *Spatial Planning for a Sustainable Singapore* (Netherlands: Springer, in association with the Singapore Institute of Planners, 2008); Ooi Giok Ling, *Sustainability and Cities: Concept and Assessment* (Singapore: World Scientific, 2005); and, Ilka Ruby and Andreas Ruby (ed.), *Urban Transformation* (Berlin: Ruby Press, 2008).

²² “Planting the First Trees”, Singapore National Parks Website, http://www.nparks.gov.sg/cms/index.php?option=com_content&view=article&id=3&Itemid=121 (accessed 10 February 2014).

²³ Peter Newman and Anne Matan, *Green Urbanism in Asia: The Emerging Green Tigers* (Singapore: World Scientific Publishing, 2013).

CHAPTER OUTLINES

The chapters in this publication have been written with the aim of showcasing experiences and examples that would be useful to both Europe and Asia. They are arranged in order of broader discussions of theoretical frameworks, broad principles, and features of eco-cities to more specific discussions of themes related to eco-cities to finally country and even local examples of eco-cities that are either in practice or are being built.

Harriet Bulkeley and Simon Marvin focus on the importance of governance as critical to the development of eco-cities, from the conception of the problem that eco-cities seek to address, to the creation of particular constellation of actors, to the implementation and continual maintenance of specific projects. Governance is broadly defined as cutting across the public/private divide, various levels of governments and transnational arenas, and that works through different socio-technical systems of cities. Citing examples of the retrofit model in Greater Manchester, the infill development model in Hammerby (Stockholm), and the green field model in Bangalore, they show how the development of these projects are structured by the dynamics and discourses of urban governance. In particular, they found that the strategic imperatives of cities and national governments, intermediary organizations, and individual champions are critical in driving the progress of eco-cities. At the same time, such progress pose challenges in the forms of governance capacity and capability required to intervene in the complex systems of a city, the conflicts of interests that emerge around what an eco-city should be, and the long-term nature of engagement by intermediaries and policy champions to see projects to their fruition.

Simon Joss highlights the importance of social sustainability as a key pillar of urban sustainability. Making a case for strengthening public engagement, Joss discerns three distinct functions of participation relating to the design, policy-making and public discourse processes. In his view, each function of participation adds value to the processes and should not be conflated. He also shows how the public can be better engaged in terms of the methodological design, the integration of the participatory procedures into policy-making and planning, and the resonance of the participatory procedures with the wider public sphere. He further cautions against regarding the “public” and the “community” as a monolithic whole but as comprising a plurality of stakeholders and interests. Such a recognition would pave the way for more tailor-made engagement processes that take into account the different types of participants involved.

Julian Goh recounts Singapore’s experience in three main areas of housing, economic development and environmental protection before and after independence in 1965. He observes that Singapore was able to grow its economy while protecting its environment, and providing for a high quality of life. He acknowledges that Singapore did not deliberately aim to be an “eco-city” from the start. Rather, its leaders learnt from the mistakes of other cities and consciously avoided them so that Singapore started on the right footing. He attributes Singapore’s success to two key factors. The first factor is to have dynamic urban governance, a point also made by Bulkeley and Marvin above, that includes its leaders setting the right vision and direction, and making adjustments along the way to suit changing circumstances

as well as the creation of strong public institutions. The second factor is to have integrated master planning and development. An example of this is Singapore's land use, which is meticulously guided by the Concept Plan (reviewed every 10 years) and Master Plan (that further details land development over the short to medium term). In his view, Singapore's experience serves as a reference for other cities undergoing rapid urbanization.

Ryokichi Hirono explains how Musashino City (a subdivision of Toyko metropolitan area), despite having a sizeable aging population over 65 years old, has been able to build an economically, socially, environmentally and culturally sustainable urban community. He attributes this success to a well-balanced combination and synergy of responsive local leadership with a strong sense of ownership of other players, including residents in Musashino City, who collectively uphold the principles of TAP₄E₄S₄.²⁴ Such a keen sense of community ownership did not emerge automatically but arose over time through a series of top-down policy interventions led by the city mayor and bottom-up initiatives by civil service organizations and other stakeholders active in the affairs of the city. He further distils lessons from the Musashino City experience which other small and medium-sized cities in Asia and Europe might find useful.

Qin Tianbao elaborates on the Sino-Singapore Tianjin Eco-city in Tianjin, China as an example of how countries in Asia are working closely together for mutual benefit. The governments of China and Singapore are working closely together on this project. Apart from examining the achievements of the eco-city since it was first conceived in 2007, Qin suggests areas of improvement such as taking into account more bottom-up initiatives including public participation, raising the ecological awareness of residents, improving the surrounding amenities in residential areas, diversifying sources of investment inflows, and reforming the body that oversees the eco-city from that of an "administrator" to that of a "servant". Qin is optimistic that these shortcomings can be overcome and that the eco-city will provide valuable experience for the transformation of other Chinese cities.

Judith Ryser makes a case for reciprocal learning between Asia and Europe in building eco-cities. In her view, practice or on-the-ground projects are essential in driving in the positive direction of sustainable development. An example is the BedZED in South London that showcases how eco-construction and green lifestyles can be easy, accessible and affordable, and yet enhance quality of life. At the same time, Ryser observes that one of the key challenges faced is capturing the value of sustainability. There is a need to move away from the conventional way of calculating real estate value based on the built-up area to a broader approach that takes into account the quality of design, sustainability and value that are reflected and experienced in the neighbourhood as a whole. In other words, the value of sustainable environments is reflected in place making, not in the narrow price of individual buildings. There is room for defining sustainability through more quantitative, evidence-based mea-

²⁴ In his paper, TAP₄E₄S₄ stands for Transparency, Accountability, Policy (P1), Planning (P2), Participation (P3) and Partnership (P4), Empowerment (E1), Equity (E2), Efficiency (E3), Effectiveness (E4) and Sustainability₄ (Economic, Social, Environmental and Cultural Sustainability).

surements so as to make a more convincing case to the public that it is in their interest to opt for more sustainable living.

Eero Paloheimo identifies certain intrinsic (i.e., intangible) and instrumental (i.e., tangible) characteristics of eco-cities. These include a strong emphasis on the harmony between nature and humanity, the presence of supporting economic activities, the beneficial lifestyle changes that would accrue to residents, and the importance of an EcoValley. An EcoValley encompasses an eco-city and a bunch of institutes dedicated to the study of different aspects of clean technology, such as energy, information and communications technology, food production, water management, waste management and construction. In an example of a collaborative effort between Europe and Asia, he cites a proposal by the Eero Paloheimo EcoCity Ltd. to build an EcoValley in Mentougou, 50 kilometres from Beijing.

Daniel Zwicker-Schwarm shares the German experience in urban development in light of several challenges, including demographic shifts, economic and technological change, roll-out of sustainable energy and adaptations to climate change. Rather than focus on green field projects for eco-cities, the German experience emphasizes steps taken to transform existing settlements into more eco-friendly cities. In contrast to the more top-down design of the Singapore experience, he highlights several exemplary projects undertaken at the local level in the areas of land use, green spaces, climate protection, transport and eco-industrial parks. All the examples underscore the importance of an integrated approach that incorporates all dimensions of sustainable development such as economic prosperity, social balance and healthy environment.

Jacqueline Cramer argues that urban areas are uniquely positioned to lead the greening of the global economy through improvements in areas such as transport, energy, buildings, technology, water and waste management systems as well as to produce a wide range of economic and social benefits. Cramer cites a number of examples in the Netherlands that are making the transition towards sustainable cities. For example, there is the “Circle City” in Rotterdam where various parties like the social housing corporation, a demolition firm, a cement producer and the municipal cleaning department joined forces and were able to close the loop of building materials. After the old houses were demolished the building materials were reused in the construction of new buildings. Not only did this process benefit the environment but also led to the employment of people who were previously jobless. Cramer also stressed the importance of active involvement of the local community. While she acknowledges that the local community may initially be reluctant to take the lead, this aversion can be overcome by launching collective initiatives and managing expectations.

BACKGROUND TO THIS PUBLICATION

This publication is the result of a series of workshops and public forums on the topic of sharing the best practices and experiences on building eco-cities in Europe and Asia held from 2012 to 2014. The participants at these workshops and forums included academics, policy-makers and practitioners from various countries in Europe and Asia. Even though they

originate from different countries, they share a common passion in wanting to make the cities that we live in more green and liveable.

At a broader level, this publication is part of a larger initiative known as the “EU-Asia Dialogue: Shaping a Common Future for Europe and Asia”. This initiative is sponsored by the European Commission and is carried out by four key partners, namely, the Konrad Adenauer Stiftung, the East Asian Institute of the National University of Singapore, the European Policy Centre in Brussels and the European Union Centre of Singapore. The objective of this initiative is to establish a platform for meaningful exchange between Europe and Asia whereby the countries in these two continents can learn from the experience of each other on areas of common concerns as well as anticipated future challenges. In this connection, seven areas were identified for study with a view to distilling policy recommendations that would be useful for policy-makers in Europe and Asia. These seven areas were eco-cities, climate change, migration and integration, social cohesion, human trafficking, maritime piracy and food security.

Urban Governance and Eco-cities: Dynamics, Drivers and Emerging Lessons

Harriet Bulkeley and Simon Marvin¹
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As sites for the resolution of various societal and environmental problems, cities have suffered a chequered history. During the early part of the 20th century, the Garden City movement proclaimed the development of new towns as a means to relieve overcrowding and pollution in the growing urban areas of the UK. By the middle of the last century, modernist thought had turned its attention to how solutions to urban problems could be designed for the city. By the 1980s, notions of sustainable development began to be applied to cities, with the 1987 Brundtland Report identifying cities as both a key challenge to and space for the development of sustainability. Drawing from these big ideas, and the experiences of various towns and communities which have sought to develop more ecological principles and practices for urban living, the idea that cities provide a critical means to respond to contemporary crises, including climate change, resource scarcity, security and poverty, has grown in popularity. While for the most part urban sustainability remained at the margins of mainstream agendas of growth and economic development espoused by global elites, international donor and policy agencies, corporations and major cities, by the 2000s, visions of low carbon cities, resilient cities, sustainable cities and eco-cities could be found across the full range of social and economic interests concerned with urban development.

Eco-cities, in the broad interpretation of the term used here, had come to be viewed as not only an environmental imperative, but also the key to future economic development and rapid urbanisation. Joss² identifies four major drivers behind this phenomenon: the growing recognition of the role of cities in producing greenhouse gas (GHG) emissions and as a site for the potential adaptation of the effects of climate change; the rapid growth of urban populations; the emergence of the green economy and the interest in developing capacity in this area and in demonstrating their green credentials; and the value-added of branding urban areas as “green” in some way. Responding to these drivers, the eco-city phenomenon takes three major forms: “retro-fit” (within existing urban infrastructure), ‘in-fill’ (urban

¹ Harriet Bulkeley and Simon Marvin are Professors at the Department of Geography, Durham University.

² Joss, S. (2010) *Eco-cities: A global survey 2009*, WIT Transactions on Ecology and the Environment, 129 (1), pp. 239-250.

expansion on large, typically brownfield, sites) and entirely new cities.”³ The variety of urban forms, infrastructures, economies and modes of social organisation that are encompassed by the term eco-cities points to its chameleon-like qualities, such that it can be adopted across a wide range of contexts from the development of new high-tech cities in China to the retrofit of basic housing areas in the poorer parts of cities in the global North and South. At the same time, eco-cities remain far from mainstream, with much urban development continuing business as usual. The adaptability of notions of eco-city across such contexts and its patchwork nature suggest that a notion of universal drivers – climate change, growing populations and the need for economic development – is insufficient in terms of understanding how eco-cities come to occupy specific discourses and practices of urban development and yet remain absent from others. Rather, it is critical to engage with the contexts within which such drivers are being interpreted, and the coalitions of political, economic and social interests through which they are being enacted and resisted – in short, to understand how, why and with what consequences eco-cities are being governed.⁴

Governance involves “conducting the public’s business...the constellation of authoritative rules, institutions, and practices by means of which any collectivity manages its affairs.”⁵ In this chapter, the broad interpretation of governance is used to examine how the governance of eco-cities is taking place and to draw out the implications for how actors in the EU and Asia might seek to support such developments in the future. In the first section, the dynamic characteristics of contemporary urban governance that have particular relevance for the development of eco-cities are examined before the key discourses of resilience, low carbon transitions and resource security that are driving current forms of eco-city development in both Europe and Asia are analysed. The analysis focuses on three examples from the UK, Sweden and India to examine how the governing of eco-city development is taking place in practice, before the chapter is concluded with a summary of the discussion and key implications for enhancing urban governance of eco-city development.

GOVERNANCE BEYOND GOVERNMENT?

Across the social sciences, the past three decades have witnessed a growing interest in understanding how society’s affairs are governed. A large and highly varied body of work has sought to demonstrate how traditional accounts of the power and workings of the state have given way to approaches in governing which are more diffused, networked and open-ended. Governance, broadly defined as the means for “authoritatively allocating resources and

³ Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, p. 331.

⁴ Bulkeley, H.A. & Betsill, M.M. (2013) “Revisiting the urban politics of climate change”, *Environmental Politics*, 22: 136 – 154; Hodson, M. and Marvin, S. (2010) *World Cities and Climate Change: Producing urban ecological security*, Milton Keynes: Open University Press; Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, 331-348.

⁵ Ruggie, J. G. (2004) “Reconstituting the global public domain—issues, actors and practices”, *European Journal of International Relations* 10, p. 504.

exercising control and co-ordination”⁶ or as “purposive acts of ‘steering’ a society or polity”;⁷ is no longer seen as a task for central government, but as involving a wide range of non-state actors and as taking place across a range of different arenas. Rather than considering governance in its normative sense – in terms of what makes “good” governance – attention within the social science community has focused on understanding the phenomenon of governance itself.

Within such accounts, governance is most often understood as the institutional arrangements and mechanisms that have been established in order to govern any particular domain. Despite the variety of literature, three particular features of such arrangements are usually common: public goals which move beyond particular private interests; some form of steering towards such goals; and some form of authority.⁸ Governance can therefore involve different combinations of actors, be established in a range of institutional forms and be accomplished in different ways, as long as these three broad criteria are met. For some, the result of such governance arrangements is the creation of particular rules and institutions that establish and shape the actions of individual and collective actors. Others suggest that historically, governing has been regarded in much broader terms as involving “any practice that more or less deliberately seeks to direct, guide or control others, for example, children, subjects, wives, a congregation, even livestock, and so forth.”⁹ In this perspective, governance operates through the “conduct of conduct” guided by particular rationalities or discourses and is undertaken by the use of different techniques.¹⁰

Whichever particular approach is adopted, acknowledging that governance takes place beyond the confines of specific governments or state-based organisations has three important consequences for understanding eco-cities. First, it suggests that both public and private authorities are central to the governing of eco-cities. This is borne out by the reality of eco-city governance as recorded in recent studies. Joss¹¹ suggests that “a key characteristic of recent eco-city initiatives has been the involvement of various business organizations (investment firms, engineering groups, building companies and architecture firms), especially in in-fill and new build projects” while “retrofit’ initiatives may be carried out through more traditional mechanisms, with more central involvement of city and/or regional authorities,

⁶ Rhodes, R. A. W. (1996) “The New Governance: Governing without Government”, *Political Studies* 44 (4): 652-667.

⁷ Lowndes, V. (2001) “Rescuing Aunt Sally: Taking Institutional Theory Seriously in Urban Politics”, *Urban Studies* 38 (11), p. 1961.

⁸ Andonova, L., M. M. Betsill and Bulkeley, H. (2009) “Transnational climate change governance”, *Global Environmental Politics*, 9 (2): 52-73.

⁹ Dean, M. (2007) *Governing Societies: Political Perspectives on Domestic and International Rule*, Open University Press, Milton Keynes, Bucks, p. 36.

¹⁰ Bulkeley, H. and Castán Broto, V. (2013) “Government by experiment? Global cities and the governing of climate change”, *Transactions of the Institute of British Geographers*, 38 (3): 361-375.

¹¹ Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, p. 336.

although here, too, new governance processes have recently emerged.”¹² A recent survey of urban responses to climate change found that municipalities led 66% of experiments, while private actors led 15% and participated in 37% of them; civil society organisations on the other hand led only 8% of experiments but participated in 17% of them.¹³

Second, the governance of eco-cities goes beyond particular territorial locations. The emergence and development of transnational municipal networks has been central to the governing of urban responses to climate change,¹⁴ creating new forms of discourse about the need and significance of collective action on the city scale and providing access to knowledge and financial resources on the one hand and providing political kudos on the other. Similarly, Joss¹⁵ finds that particular eco-cities initiatives are not derived from particular local contexts, but are defined “through wider international discourses and processes”. Citing Hult,¹⁶ he suggests that central to the international mobilisation and development of eco-cities has been the development of new forms of economy where efforts are invested in “exporting Scandinavian urban sustainability services to China, as in the case of Tangshan Caofeidian, a new eco-city currently developed with Swedish engineering group Sweco.”¹⁷ For Blok,¹⁸ such processes can be conceptualised as a form of “green cosmopolitanism” in which urban sustainability networks “facilitate extensive mobilities of ‘green’ expertise, narratives, and sociotechnical innovations”. The growing array of international actors involved in eco-cities and the processes of “green cosmopolitanism” that they practise should not, however, be taken to imply an even spread of eco-city discourses and interventions. Rather, there are distinct and uneven geographies to the transnational mobility of eco-cities, such that they appear to be concentrated in “global” or “world” cities, which “serve not only as transnational hubs of economic, political, and cultural flows; they also emerge as the hubs of new ‘green’ flows of technical and policy

¹² Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, p. 333.

¹³ Castán Broto, V. and Bulkeley, H. (2013) “A Survey of Climate Change Experiments in 100 Cities”, *Global Environmental Change* 23, 1: 92-102.

¹⁴ Betsill, M. M. and Bulkeley, H. (2004) “Transnational networks and global environmental governance: The Cities for Climate Protection program”, *International Studies Quarterly* 48: 471-493; Kern, K. and Bulkeley, H. (2009) “Cities, Europeanization and Multi-level Governance: Governing climate change through transnational municipal networks”, *Journal of Common Market Studies*, 47 (2): 309-332.

¹⁵ Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, p. 339.

¹⁶ Hult, A. (2011) “The Swedish production of sustainable urban imaginaries in China”, Conference paper presented at the 5th International Eco-City Conference, Johns Hopkins University, Baltimore, MD, 17-18 June 2011.

¹⁷ Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, p. 339.

¹⁸ Blok, A. (2012) “Greening cosmopolitan urbanism? On the transnational mobility of low-carbon formats in Northern European and East Asian cities”, *Environment and Planning A* 44, p. 2328.

expertise on urban sustainability.”¹⁹ Furthermore, such flows seem to be particularly evident between such cities in Asia and Europe.²⁰ These flows in turn serve to create a patchwork of ideas and interventions, such that the development and governance of eco-cities takes the form of urban bricolage.²¹

Third, a governance perspective needs to engage with the socio-technical networks which “structure a major part of the material metabolism in industrialized societies...[and] are key catalysts of environmental problems like air, water, and soil pollution, and nuclear risks, and...global warming.”²² Despite this important role in shaping the possibilities for urban environmental governance, Monstadt suggests that such networks have for the most part “been a blind spot in contemporary governance studies”.²³ Recent research has taken up this challenge. Hodson and Marvin²⁴ demonstrate how new forms of urban ecological security are being developed in response to the risks to critical infrastructure posed by global environmental change and the opportunities emerging from new forms of investment in resource security. In their analysis of the role of climate change experiments in urban politics, Bulkeley and Castán Broto²⁵ draw insights from science and technology studies and urban political ecology to demonstrate how novel technologies, infrastructure networks and the flows of urban metabolisms play a central role in the urban response to climate change. The importance of the material, and technological aspects of governing eco-cities is perhaps most apparent in terms of what Joss²⁶ refers to as “projectified” approaches in which new actor constellations “assemble around an agreed set of objectives, targets and planning, organizational and control processes”. Where the urban governance of eco-cities is increasingly orientated

¹⁹ Blok, A. (2012) “Greening cosmopolitan urbanism? On the transnational mobility of low-carbon formats in Northern European and East Asian cities”, *Environment and Planning A* 44, p. 2334; see also Hodson, M. and Marvin, S. (2010) *World Cities and Climate Change: Producing urban ecological security*, Milton Keynes: Open University Press.

²⁰ Blok, A. (2012) “Greening cosmopolitan urbanism? On the transnational mobility of low-carbon formats in Northern European and East Asian cities”, *Environment and Planning A* 44: pp. 2327-2343; Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, 331-348.

²¹ Blok, A. (2012) “Greening cosmopolitan urbanism? On the transnational mobility of low-carbon formats in Northern European and East Asian cities”, *Environment and Planning A* 44: pp. 2327-2343; Bulkeley, H. and Castán Broto, V. (2013) “Government by experiment? Global cities and the governing of climate change”, *Transactions of the Institute of British Geographers*, 38 (3): 361–375.

²² Monstadt, J. (2009) “Conceptualizing the political ecology of urban infrastructures: Insights from technology and urban studies”, *Environment and Planning A* 41(8), pp. 1924-1942.

²³ Monstadt, J. (2009) “Conceptualizing the political ecology of urban infrastructures: Insights from technology and urban studies”, *Environment and Planning A* 41(8), pp. 1924-1942.

²⁴ Hodson, M. and S. Marvin (2009) “Urban Ecological Security: A New Urban Paradigm?”, *International Journal of Urban and Regional Research* 33(1): 193-215.

²⁵ Bulkeley, H. and Castán Broto, V. (2013) “Government by experiment? Global cities and the governing of climate change”, *Transactions of the Institute of British Geographers*, 38 (3): 361–375.

²⁶ Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, 331-348.

towards projects, interventions and experimentation of different kinds, both the strategic insertion of new notions of environmental governance into particular material dynamics and flows of the city, as well as more mundane, day-to-day, ways in which eco-cities are repaired and maintained come to play a critical role in how the governing of eco-cities unfolds.²⁷

Understanding governance as a phenomenon that cuts across the public/private divide, operates at different levels of government and through transnational arenas, and works through socio-technical systems demonstrates some of the dimensions of the emergence and development of eco-cities that need to be taken into account if their importance and relevance in contemporary urban contexts is to be understood. The next section looks more closely at the specific ways in which issues of urban sustainability are being addressed before considering three cases that exemplify some of the specific drivers and challenges that are being encountered.

ECO-CITIES: GOVERNANCE FOR RESILIENCE, CARBON CONTROL AND SECURITY?

While the idea of eco-cities has a long history, over the past two decades attempts to develop forms of urban sustainability have become more prominent. Driven initially by the idea of “think global, act local” and the discourse of sustainable development that emerged in the 1980s from the 1987 Brundtland Report and the 1992 United Nations Conference on Environment and Development (the Rio Conference), urban sustainability initiatives began to be regarded in relation to concerns about climate change and urban resilience during the 1990s. In the 2000s, urban responses to climate change began to move from the largely voluntary actions of municipalities to the taking of a more strategic role within the mainstream business and governance of cities, particularly large municipal governments, in response to three key agendas: resilience, low carbon transitions and urban security.²⁸ The governance of eco-cities in the EU and Asia is being critically shaped by these three underpinning approaches to urban sustainability.

Urban Resilience

The emergence of resilience almost appears to have displaced the sustainability discourse in its dominance in research and policy thinking about the environmental dimensions of cities.²⁹ Increasingly resilience appears to be mainstream within urban policy with practitioners implementing resilience strategies and policies in fields as diverse as climate change, flooding,

²⁷ Graham, S. and N.J. Thrift (2007) “Out of order – Understanding repair and maintenance”, *Theory, Culture and Society* 24, 1-25.

²⁸ Bulkeley, H.A. & Betsill, M.M. (2013) “Revisiting the urban politics of climate change”, *Environmental Politics*. 22: 136-154; Hodson, M. and S. Marvin (2009) “Urban Ecological Security: A New Urban Paradigm?”, *International Journal of Urban and Regional Research* 33(1): 193-215.

²⁹ Davoudi, S. (2012) “Resilience: A Bridging Concept or Dead End?” *Planning Theory and Practice*, 13, 2, 299-333.

energy infrastructure and logistics. Central to this shift is the critical role played by urban responses in helping cities deal with systemic vulnerabilities and resist or adapt to disruptive changes. The UNISDR³⁰, for example, recently launched a new guide and global campaign with the objective of “Making Cities Resilient: my city is getting ready!” A number of key actions are seen as central to preparing for and reducing urban risks: building institutional capacity, identifying and monitoring risks, building a culture of resilience, reducing risk factors and strengthening disaster preparedness.

Such guidance is becoming more commonplace as cities are asked to take the challenge of resilience seriously and commit to strategic plans to reduce vulnerability. For example, the European Environment Agency project report on Urban Adaptation to Climate Change in Europe warned that predicted climate scenarios presented a number of threats, including flooding, economic disruption and a range of public health issues.³¹ Such threats also risked undermining urban infrastructures like energy, waste and transport that are essential to the day-to-day functioning of cities. The recent book collection, *Resilient Cities*,³² highlighted seven modifications that were linked to the design and use of new technologies in existing infrastructures that could potentially enhance resilience. These included enhancing renewable energy technologies, increasing carbon neutral design, adopting increasingly localised instead of large centralised infrastructure systems, improving green infrastructures and spaces, developing a system where energy and material increasingly come from renewable sources, supporting place-based solutions and committing to sustainable transport particularly electrified vehicles, cycling and walkable cities. Although such a systemic transition was seen as desirable, a series of issues – not least financial constraints especially in the current period of austerity – were seen as barriers to the realisation of such a vision.³³ Nonetheless, such underlying principles as well as specific measures to enhance resilience are an increasingly common feature of eco-city developments, particularly those that seek to retrofit urban areas or those that are being undertaken on brownfield land in inner-city areas which are largely vulnerable to flooding and potential sea level rise, such as the Thames Gateway in the UK.

The increasingly accepted use of the term *resilience* and its application to a wider range of urban policy areas is raising questions about whether resilience has become a catch-all phrase that has been applied to a whole series of different issues so much so that it loses its meaning. More recent work within the social sciences has started to look critically at what might be useful from resilience thinking and how it could be turned into a critical research and policy

³⁰ UNISDR (2012) *Making Cities Resilient Report*, UNISDR, New York.

³¹ European Environment Agency (2012) *Urban Adaptation to Climate Change in Europe*, EEA Report No 2, 1-143.

³² Newman, P. Beatley, T. and Boyer, H. (2009) *Resilient Cities: Responding to Peak Oil and Climate Change*, London, Island Press.

³³ ICLEI (2011) *Financing the Resilient City: A Demand Driven Approach to Development, Disaster Risk Reduction and Climate Adaptation*, ICLEI, Bonn.

agenda.³⁴ Three sets of ideas from this are helpful in understanding how a resilience agenda could be constituted. The first regards the limits of narrow engineering or ecological conceptions of resilience that are primarily focused on the ability of a system to return to “normal” after a disturbance or the magnitude of the disturbance that can be absorbed before the system changes. Second, in contrast, “evolutionary resilience” challenges the idea of normal and argues that the nature of the system may itself change over time. In this view, resilience is not conceived as a return to normality but as the ability of complex systems to change and adapt to and transform into responses to both internal and external stresses and strains. This alternative approach seems to offer a way of thinking about reconfigured infrastructural or green futures in which the parameters of a transformed future are open to debate and dialogue. Third, even with this enlarged notion of resilience and system changes there are a number of issues that flow from the application of a concept developed from the natural sciences to the social sciences. The main challenges of translating resilience from ecology to urban studies have to do with politics and power and the critical questions of what are the desired outcomes and resilience for whom, which raise questions about the sorts of sustainability and in whose interests the moves of developing eco-cities might support.

Carbon Regulation and Urban Low Carbon Transitions

Another emerging response in the last decade has been the emergence of a policy and research debate around carbon regulation and the implications for urban low carbon transitions within infrastructures and resources flows.³⁵ While interest in urban low carbon transitions has been driven partly by bottom-up activities of cities, it has also taken place in the context of a set of top-down processes that have served to establish new policy goals for reducing carbon and new market structures through which this can take place.³⁶ Carbon is increasingly seen as a currency, with value being attached to market-based instruments such as cap-and-trade schemes. Thus, when emissions are embodied in targets and quotas and value is attached to carbon emissions, monitoring becomes central. What becomes important is the construction of carbon regulation using a set of criteria (targets, quotas, policies, technologies, behaviours, etc.) in relation to the city, the construction of methodologies to monitor emissions sources, and the political and policy strategies of response. Various forms of eco-city development, from large-scale “zero carbon” cities to the refurbishment of particular neighbourhoods with

³⁴ Byrne, J. Gleeson, B. Howes, M. and Steele, W. (2009) “Climate Change and Australia Urban Resilience: The Limits of Ecological Modernization as an Adaptive Strategy” in Davoudi, S. Crawford, J. and Mehmood, A. eds. *Planning for Climate Change: Strategies for Mitigation and Adaptation for Spatial Planners*, Earthscan, London; Davoudi, S. (2012) “Resilience: A Bridging Concept or Dead End?”, *Planning Theory and Practice*, 13, 2, 299-333.

³⁵ While, A., Jonas, A. E. G. and Gibbs, D. (2010) “From sustainable development to carbon control: Eco-state restructuring and the politics of urban and regional development”, *Transactions of the Institute of British Geographers* 35: 76-93.

³⁶ Bulkeley, H.A. & Betsill, M.M. (2013) “Revisiting the urban politics of climate change”, *Environmental Politics*. 22: 136-154; While, A., Jonas, A. E. G. and Gibbs, D. (2010) “From sustainable development to carbon control: Eco-state restructuring and the politics of urban and regional development”, *Transactions of the Institute of British Geographers* 35: 76-93.

low carbon energy and waste systems, have been critical to bringing the notion of a low carbon transition into the urban arena.

Despite the apparent consensus about the need for action to address climate change, such forms of intervention are highly contested. On an urban scale political struggles take place over not only investment, but also regulatory/control choices and the renewed engagement of citizens in governance strategies.³⁷ National pressures for effective sub-national carbon management are pursued through combinations (that differ in contexts) of investment in low carbon infrastructure and efforts to shape low carbon firms and consumers through the use of emissions targets, carbon finance and local economic development strategies. These in turn are replicated and often exceeded urban level targets, policies and plans. There is, however, a large gap between such symbolic representations of a low carbon future and accompanying broad-brush efforts to achieve change and the material manifestations of low carbon transition in particular places. In no small part this disconnect arises because of the need for effective governance capacity and capability to act at the urban level in order to undertake the systemic change necessary to achieve the fundamental transitions that such plans and strategies articulate. The transitions required to meet ambitious targets cannot be achieved by simple technical fixes or low-level changes in behaviour. What is required is a fundamental transformation of socio-technical infrastructure systems – including “new” forms of energy technology, as well as new regulatory frameworks, patterns of consumption, governance frameworks, spatial organisation and so on – which draw a large number of actors, artefacts and interests into a complex web. As a result, urban capacity and capability to act cannot be regarded in purely institutional terms, but is determined through particular political economies and socio-technical networks that cross multiple scales.³⁸ Eco-city developments, as discussed earlier, often bear the hallmark of the public-private authority, transnational mobilisation and socio-technical intervention required to realise such forms of governance capacity, which may provide an explanation to why such developments are an increasingly important form of urban governance response to low carbon transitions.

Urban Securitisation

Alongside issues of resilience and low carbon transitions, economic, ecological and political pressures are placing increasing emphasis on the “security” of infrastructure and resource flows on a range of different scales.³⁹ Strategic national interest in energy, water and resource security are translating into efforts to understand the longer-term implications of climate

³⁷ While, A., Jonas, A. E. G. and Gibbs, D. (2010) “From sustainable development to carbon control: eco-state restructuring and the politics of urban and regional development”, *Transactions of the Institute of British Geographers* 35: 76-93.

³⁸ Bulkeley, H., Castan Broto, V., Hodson, M. and Marvin, S. (2011) *Cities and Low Carbon Transitions*, Routledge, London.

³⁹ Barry, J. and R. Eckersley (2005) *The State and the Global Ecological Crisis*. MIT Press, Cambridge, MA; Meadowcroft, J. (2005) “From welfare state to ecostate”, in Barry, J., and Eckersley, R., (eds) *The State and the Global Ecological Crisis*, MIT Press.

change and resource scarcity on an urban scale. Major cities and private sector actors have also identified areas of critical infrastructure that require some form of intervention. These pressures create the conditions under which cities and regions strategically attempt to secure the resources necessary for their ecological and material reproduction. Increasingly certain cities are developing a more strategic orientation towards questions about their future resource requirements.⁴⁰ Critical to this is the incorporation of resource endowments and the ability to overcome constraints in the economic and social competition between cities. In a very real sense a new dimension of the competitive positioning of cities is their ability to internalise, bound and control their resource endowment, supply, consumption and production. Cities are attempting to enclose resources, and eco-city developments that provide a means for accessing new resources (e.g., renewable energy generation) or reducing the resources required to meet other goals for housing provision and economic development (e.g., closed-loop resource management systems such as water recycling) offer a critical means to achieving this political imperative.

As a result of concerns for securing resources, new styles of infrastructure development are being adopted that privilege particular spatial and socio-technical configurations of infrastructure.⁴¹ In particular, the world's largest cities are beginning to translate their strategic concern about their ability to guarantee resources into strategies designed to reshape the city and its relations with resources and other spaces through three sets of responses. First, ensuring the strategic protection of cities from the impacts and effects of climate change and associated resource constraints. Second, building "autarky" in the supply of water and energy, the mobility of people and goods, and the disposal of wastes. Third, collectively creating new global urban agglomerations of infrastructural linkages that reinforce connectivity between world cities. These responses contribute to the securitisation of resource flows that are organised through language and concepts such as decarbonisation, neutrality, self-sufficiency and resilience on a range of different scales from the metropolitan area to individual buildings. However, these are not taking place in an even manner, creating separate pockets of resource security that are shaped by pre-existing power relationships, assets and endowments – knowledge, technology, finance and so on – which may in turn have wider implications for both the sustainability and governability of cities.

ECO-CITY GOVERNANCE IN PRACTICE

The governance of eco-cities needs to be understood as comprising public-private authority, a multi-scale and transnational process, and one that operates through the socio-technical networks of cities, and as driven by three related agendas – resilience, low carbon transitions and urban security. Understanding these dynamics is critical for any analysis of how and why

⁴⁰ Hodson, M. and S. Marvin (2009) "Urban Ecological Security: A New Urban Paradigm?", *International Journal of Urban and Regional Research* 33(1): 193-215.

⁴¹ Hodson, M. and Marvin, S. (2012) "Mediating Low-Carbon Urban Transitions? Forms of Organization, Knowledge and Action", *European Planning Studies* 20(3): 421-439.

the governing of eco-cities takes place in particular contexts, and the ways in which governance capacities and capabilities for eco-city development might be further strengthened. In this section, three examples of eco-city development that represent the three main types identified by Joss⁴² – retrofit in Greater Manchester, urban infill development in Stockholm and greenfield eco-cities in Bangalore – will be reviewed. In each case, the focus is on the role of leadership and/or opportunities, the specific intermediaries created to realise the project, and the role of experimentation and innovation in shaping the governance of eco-cities in practice.

City-Regional Retrofit – Greater Manchester UK

The UK government has a legally binding commitment to decarbonisation, enshrined in targets of 80% cut in GHG emissions by 2050 and 34% by 2020. This is to be achieved using five-year carbon budgeting systems. These developments create new pressures relating to climate change and carbon regulation and place renewed emphasis on sub-national territorial units to accelerate the development of low carbon transitions in energy production, consumption and mediation through the built environment. As a metropolitan area of 2.6 million people encompassing 10 local authorities, Greater Manchester has to achieve significant carbon emissions reductions. It needs to do this in the context of contributing to national emissions reduction targets and as part of an emerging world where city-regions are in an ecological competition to have secure access to cleaner energy resources necessary to fuel economic activity. Originally established in 1974 as the second and overarching tier of municipal government, Greater Manchester County Council was abolished in 1986 and was only recently replaced in 2011 by the Greater Manchester Combined Authority (GMCA) with responsibilities for economic development, transport and regeneration. In this context of limited governance capacity, strong national drivers of decarbonisation and the current era of austerity politics in which finance for investment is severely constrained in the UK, addressing issues of urban sustainability has been challenging.

In Greater Manchester a framework for doing so has been set out to achieve targets for delivering domestic carbon reductions of 55% by 2022 as part of a wider target of 48% carbon emissions reduction by 2020. The Greater Manchester low carbon housing retrofit strategy sets out what needs to be done so that the retrofitting of nearly 1.2 million homes contributes to those targets. The dominant national/city-regional policy and business-led view of the relationship between Greater Manchester and retrofit is largely “top down” and is positioned as a way of achieving “first mover” economic status and as a leader in an emerging UK retrofit market. In doing so the development of a retrofit agenda is seen as a way to attract private investment to the city-region as a test-bed for realising national priorities. In this case, eco-city development is driven by a mixture of public and private interests in the city, directed by national objectives and working through a large existing housing stock that is in need of renovation.

⁴² Joss, S. (2011) “Eco-City Governance: A Case Study of Treasure Island and Sonoma Mountain Village”, *Journal of Environmental Policy & Planning*, 13:4, 331-348.

Urban Eco District of Hammarby Sjöstad, Sweden

Hammarby Sjöstad is designed to be an emblematic sustainability district based on the transformation of an old port and industrial area that will host 13,000 apartments by 2015. Three elements of this project are of particular interest. First, the wider context for the project needs to be located in the late 1990s when the regeneration of the area was conceived in the context of Stockholm's failed bid to host the 2004 Olympics. The idea was to create an emblematic sustainability district that would boost the visibility of Stockholm as a sustainability showcase on the world stage.⁴³ When work started, the City of Stockholm owned the water, waste and energy companies which were instructed to work on the development of a neighbourhood-level recycling model based on a customised and localised infrastructural model of closed metabolic loops. Second, although initially designed as quite an ordinary development, the linkage of the redevelopment to the Olympics and associated new environmental priorities required the creation of a new intermediary organisation to mediate between the different interests involved in the new design. The overarching aim of Hammarby Sjöstad's Environmental Programme is for the area to perform "twice as well" as ordinary new housing of the time.⁴⁴ In order to achieve this, a project team comprising representatives from the city administration and development companies was established which formed an organisation that "integrated the city's actors, creating a potentially powerful meta-governor for the project."⁴⁵ This new intermediary was located outside the municipality and charged with speeding up the planning process through not only ordinary governing routines, but also networking and novel ways of negotiation and persuasion. It played a critical role in reshaping a conventional development process and introducing more ambitious environmental targets in the space created by the Olympic bid, and even after its eventual rejection, some energy aspects of the project were strengthened. As an intermediary it also played a crucial role in new priorities and objectives but the process of implementation was more akin to "muddling through". Third, experimentation and innovation played a key role especially in working with municipal infrastructure companies. The project was based on the development of joined-up solutions for water, wastewater, waste and energy, and the systems perspective deployed enabled Hammarby to achieve its environmental goals and reduce its metabolic flows by linking district heating, sewage treatment, biogas production and waste management into

⁴³ Coutard, O. and Rutherford, J. (2011) "The rise of post-networked cities in Europe? Recombining infrastructural, ecological and urban transformations in low-carbon transitions", in Harriet Bulkeley, Vanesa Castán Broto, Mike Hodson, Simon Marvin (eds.) *Cities and Low Carbon Transitions*, London: Routledge (Routledge Studies in Human Geography).

⁴⁴ Stockholms Stad (1997) *Miljöprogram för Hammarby Sjöstad [Environmental programme for Hammarby Sjöstad]*. Stockholm (Sweden): SBK, Miljöförvaltningen and GFK.

⁴⁵ Svane, O., Wangel, J., Engberg, L. A. and Palm, J. (2011) "Compromise and learning when negotiating sustainabilities: The brownfield development of Hammarby Sjöstad, Stockholm", *International Journal of Urban Sustainable Development*, 3 (2), p. 142.

an integrated system,⁴⁶ an approach that is now used by most of the neighbourhoods in the Stockholm metropolitan area. Despite its success, this form of experimentation produced some interesting lessons: first, in terms of ensuring that environmental goals are identified sufficiently upfront in a project to reduce conflict between different parties, and second, in ensuring that systemic data gathering and evaluation is included in the project, as without this, there is concern that Hammarby will not be able to demonstrate how much it is meeting its environmental priorities.

Towards Zero Carbon Development in Bangalore, India

Bangalore is a rapidly growing city that has undergone significant transformation in the last two decades along with the development of the IT industry and the growing middle class. These social and economic shifts have had an important impact across the city, in particular through the creation of new private urban developments, compounds or gated communities, on the edge of the city. These developments often place significant pressure on the resources of the city, particularly in terms of energy and water. With only a limited municipal water supply system that extends to the planned areas of urban development, such new private developments have to either pay high prices for water in the market or open up boreholes to tap into the aquifers below the city, reducing water availability in the long term for the city's wider population.⁴⁷ In this context, on the concern for resource security for a rapidly growing city, the Towards Zero Carbon Development (T-Zed) project initiated by private developer BCIL (Biodiversity Conservation India Limited) sought to create an alternative means for middle-class residents of Bangalore to pursue their lifestyle ambitions whilst sustaining a new form of responsible living.⁴⁸ The aim of the development, which includes 16 single-family houses and 75 apartments, was to reduce dependence on the city's resources by creating a "zero carbon" housing development. While replicating many of the features associated with urban development in Bangalore, as a greenfield development on the urban fringe that provided a high degree of comfort and access to the common attributes of middle-class living in India (e.g., air conditioning, swimming pool and club house), the design of the project was highly distinct from mainstream urban development in the city. In particular, the design incorporated micro-generation technologies, a water re-use system, the use of local materials to reduce the embodied energy of the building, passive cooling, and the use of novel refrig-

⁴⁶ Pandis Iverot S. and Brandt N. (2011) "The development of a sustainable urban district in Hammarby Sjöstad, Sweden?", *Environ Dev Sustain*, 13(6):1043-1064.

⁴⁷ Ranganathan, M, L Kamath and V Baindur (2009) "Piped Water Supply to Greater Bangalore: Putting the Cart before the Horse?", *Economic & Political Weekly XLIV* (33).

⁴⁸ Bulkeley, H. and Castán Broto, V. (2012) "Urban experiments and climate change: securing zero carbon development in Bangalore", *Contemporary Social Science*, Online First 27th July 2012, DOI: 10.1080/21582041.2012.692483.

eration and air-conditioning systems to reduce the energy used through the lifetime of the development.⁴⁹

In their analysis of the case, Bulkeley and Castán Broto⁵⁰ find that the leadership of BCIL was critical to getting the project off the ground, but this only succeeded because of the way they were able to gather a range of different actors who were interested in trialling new forms of urban development and low carbon technology in the city. In practice, many of the innovations did not work as planned, with challenges encountered in the refrigeration, air conditioning and water provision systems, as well as in making the local materials conform to the finished look expected in this type of housing. Some of these challenges were technical in orientation, but others reflected the complexities of not only building eco-city developments, but also seeking to ensure that those who inhabit them do so in a manner that is in keeping with the aims and objectives of the developer. To this end, along with other forms of education and pro-environmental activities, BCIL installed “conscience meters”, automated feedback of resource consumption, to make residents aware of their use of energy and its costs.⁵¹ While finding favour with the residents, who were no doubt attracted to it because of its explicit emphasis on living a low carbon lifestyle, the regulation of everyday life to achieve a low carbon development was not without controversy. This in turn points to the challenges of moving eco-city developments off-plan and into reality. At T-Zed, BCIL has shifted from being purely a developer, whose initial intention was to pass the project on to another party, to encompass a long-term management role for the development as well. This in turn implies that the role of leaders and intermediaries in eco-city development is not one-off, but ongoing if they are to have a long-term impact.

CONCLUSIONS AND EMERGING LESSONS

Governance, as the means through which governing is accomplished, is critical to the development of eco-cities, from the conception of the problem that eco-cities are seeking to address, to the creation of particular constellations of actors, and the implementation and continual maintenance of specific projects. This chapter shows that the governing of eco-cities, as part of the broad suite of urban sustainability, has three distinct features: it encompasses public and private authority; it operates through networks that structure governance “vertically” through relations between different tiers of organisation and “horizontally”, in particular through transnational municipal networks and the growing circulation and mobility of notions of

⁴⁹ Bulkeley, H. and Castán Broto, V. (2012) “Urban experiments and climate change: securing zero carbon development in Bangalore”, *Contemporary Social Science*, Online First 27th July 2012, DOI: 10.1080/21582041.2012.692483.

⁵⁰ Bulkeley, H. and Castán Broto, V. (2012) “Urban experiments and climate change: securing zero carbon development in Bangalore”, *Contemporary Social Science*, Online First 27th July 2012, DOI: 10.1080/21582041.2012.692483.

⁵¹ Bulkeley, H. and Castán Broto, V. (2012) “Urban experiments and climate change: securing zero carbon development in Bangalore”, *Contemporary Social Science*, Online First 27th July 2012, DOI: 10.1080/21582041.2012.692483.

what constitute an “eco-city” development; and it is undertaken via urban socio-technical systems, demonstrating the significant role of urban infrastructure networks in the governing of the city.

These forms of urban governance for eco-city development are now being orchestrated in relation to three main discourses – resilience, low carbon transition and resource security. While the drivers, actors and technologies involved in each of these arenas vary, they come together in different constellations in particular contexts to provide the basis upon which the idea of eco-city development is founded and serve to structure how such developments are envisaged, the inclusion (and exclusion) of the range of actors and the basis upon which judgments are reached about their success.

The three cases, of retrofit, infill and newly built eco-cities in Manchester, Stockholm and Bangalore respectively, demonstrated how in practice the work of eco-city development is structured by the dynamics and discourses of urban governance outlined above. The strategic imperatives of cities and national governments, intermediary organisations and individual champions are found to be critical to translating the desire for eco-city developments into reality. At the same time, such developments pose significant challenges, not least in creating the forms of governance capacity and capability required to intervene in the complex systems of the city, the conflicts of interest that emerge around what the eco-city should be (and for whom) and the long-term nature of engagement required by intermediaries and policy champions in order to realise particular projects.

These findings suggest some important lessons for the future governance of eco-city developments in the EU and Asia:

- The mixture of public and private authority required means that careful consideration should be given to ensure accountability and that all interests are represented in eco-city developments to avoid the charge that such initiatives serve only social elites.
- The governance of eco-city development needs to focus on not only building capacities and capabilities for specific contexts and projects, but also the enabling networks that operate transnationally to support eco-city development.
- Such an approach could seek to ensure greater “mobility” of existing ideas and lessons for eco-city development that are emerging from the multiple interventions taking place across the EU and Asia. This will mean not only learning “what works” but also ensuring that due attention is given to “what does not work” and drawing lessons from cases where implementation has been limited and controversy has arisen.
- Successful eco-city development requires not only the development of new social alliances, but also the linking of different network infrastructures. This socio-technical alignment is often challenging in contexts where such assets are owned and managed by different companies with different logics and goals. More work is required to understand how new forms of urban infrastructure management can be developed to enable eco-city development.
- Finally, the chapter has pointed to the key role of intermediaries in initiating and sustaining eco-city developments. Yet there is limited policy attention given to how

such intermediaries might be established, and the sorts of business and governance models required to enable them to flourish. This is a critical policy challenge.

Rising to the Challenge: Public Participation in Sustainable Urban Development

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INTRODUCTION

Public participation in the governance of urban sustainability can appear as something of a paradox: it is held up as “good practice” in planning and policymaking, and yet it often proves elusive and easily gets lost in technocratic processes. Where it is embraced and put in action, its function is often vague; it can be beset by problems of design and implementation; and it can produce outcomes that bear little relevance to actual decision processes. There is, then, often a discrepancy between the ideal of “deep” participation and the reality of “thin” participation: the former centred upon empowering and giving “voice” to the community, the latter based on cursory opportunity for debate and engagement.

That public participation, nevertheless, remains a central theme for urban sustainability is for the following three interrelated reasons: first, however hard it may be to realise it in practice, participation is widely held as a normative ideal of good governance — even democracy — worth striving for. Second, it has gained added significance within the context of contemporary governance, which is characterised by a relative shift from traditional forms of government to new modes of planning and decision-making centred upon the cooperation and networking among diverse public and private actors. Third, it is seen as particularly relevant for achieving *social* sustainability, by emphasising the social dimensions of urban sustainability and involving those affected in the process. Public participation, then, has the potential to inform and improve urban sustainability practice both procedurally and substantively, contributing to the co-production of place-specific knowledge and reflexive discourse in a pluralistic, open and transparent way.

Against this background, the aim of this article is to discuss recent concepts and practices of public participation in relation to urban sustainability. The article summarises key debates and developments over the last half a century, followed by an elaboration of core aspects of

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public participation in the governance of the sustainable city. The conceptual perspectives are complemented by short case studies, drawing on practical examples of public engagement. The article concludes with a discussion of “good practice” lessons.

HISTORICAL PERSPECTIVES

Interest in the community, and community engagement, has not just been a recent theme in urban sustainability. The garden city, Ebenezer Howard’s innovative concept (first published in 1898) which fundamentally influenced modern urban planning, placed the community at the centre of the debate about what the city in the industrial age ought to look like.² It proposed to redress the detrimental impacts of unfettered industrial and economic development on an increasingly urbanised population, by designing urban centres in a radically new way including: the separation of residential areas from industrial districts; walkable access to community amenities; the use of green space both within and surrounding the city; and the interlinking of urban centres with municipal railways. A further, significant characteristic of the garden city concept is community-based governance in the form of, for example, cooperative land ownership and self-governing community organisations. In other words, the active engagement of the community, and planning centred upon public interests were at the very heart of the original vision for urban sustainability.

While the garden city concept profoundly shaped thinking and policy in the first half of the 20th century, the increasing professionalisation of urban planning meant that the focus on community engagement gave way to a more technocratic approach, which placed planning experts at the centre of decision-making. It was not until the 1960s and 1970s that urban planning was challenged, once again, by calls to open up to community involvement and to address more centrally social concerns, such as the impoverishment of city centres and the disenfranchisement of minority groups. This coincided with the growing environmental awareness at the time, and reflected wider social and cultural trends centred upon calls for the “democratisation” of expertise and greater public participation in policy- and decision-making.

The “ladder of citizen participation” by Sheryl Arnstein³ turned out to be one of a number of key contributions to the growing discourse on community and public participation in urban planning, as well as in other fields of public policy (environment, health, technology, etc.). Apart from providing advocacy for greater public engagement, Arnstein’s influential paper drew attention to the complexity of what constitutes public participation and related pitfalls. In particular, it appraised various types of engagement, from basic information provision (at the bottom of the participatory ladder) to citizen control (at the top), and the importance of properly differentiating between various forms of participation.

² Kargon, R and AP Molella, *Invented Edens: Techno-Cities of the 20th Century*, Boston, MA, MIT Press, 2008; and Wheeler, SM and T Beatley, *The Sustainable Urban Development Reader (2nd ed)*, Abingdon, Routledge, 2009.

³ Arnstein, SR, “A Ladder of Citizen Participation”, *Journal of the American Planning Association*, vol. 35, no. 4, 2004, pp. 216-224.

Notable practical examples of community involvement and citizen participation in urban planning growing out of the 1970s and 1980s include the so-called “planning cell” (*Planungszelle*) originally developed in Germany as a method of involving citizens in urban planning processes.⁴ A highly structured, participatory process, the planning cell produces citizens’ assessment reports (*Bürgergutachten*) which are fed into the formal planning and policymaking process. A similar method, developed in parallel in the United States, is the “citizens’ jury”, at the centre of which is a group of a dozen or so randomly chosen citizens brought together to deliberate and reach a joint decision on a policy issue.⁵ “Participatory budgeting” is another method applied to urban policy processes.⁶ Pioneered by the city of Porto Alegre (Brazil) in the late 1980s, it has since gained prominence elsewhere in Latin America — where over one thousand participatory budgeting processes have taken place to date — and in Europe, where over one hundred cities have used the process. Other structured methods of public participation developed in the policy field of technology assessment (TA) and applied to urban sustainability issues (e.g., urban ecology, and urban transport) include the “consensus conference”, “scenario workshop” and “future workshop”.⁷

International governmental acknowledgement of the need for public participation in local urban decision-making came with Agenda 21, the sustainability action plan resulting from the landmark Earth Summit held in Rio de Janeiro in 1992.⁸ Chapter 28 of Agenda 21 calls upon cities and other local authorities to “enter into a dialogue with citizens, local organizations and private enterprises” to develop mutual understanding and strategies for sustainability. While not legally binding, Local Agenda 21 was soon widely adopted by local governments, as part of community engagement and public participation, which have become mainstream in policymaking. Building on Agenda 21, the Charter of European Cities & Towns Towards Sustainability signed in the city of Aalborg in 1994 (also known as the Aalborg Charter) declared that “we [cities] shall ensure that all citizens and interested groups have access to information and are able to participate in local decision-making processes”.⁹

⁴ Citizen Participation in Science and Technology (CIPAST), “Planning Cell”, at <<http://www.cipast.org/cipast.php?section=1018>> (accessed 31 July 2013).

⁵ Jefferson Center, “Citizens’ Juries”, at <<http://www.jefferson-center.org/what-we-do/citizen-juries/>> (accessed 31 July 2013); and Citizen Participation in Science and Technology (CIPAST), “Citizens’ Jury”, at <<http://www.cipast.org/cipast.php?section=1016>> (accessed 31 July 2013).

⁶ United Nations Human Settlements Programme (UN-Habitat), *Planning Sustainable Cities: Global Report on Human Settlements 2009*, London/Sterling, VA, Earthscan, 2009; Roseland, M, *Toward Sustainable Communities: Solutions for Citizens and their Governments (4th ed)*, Gabriola Island, New Society Publishers, 2012, p. 265.

⁷ Joss, S and J Durant, *Public Participation in Science: The Role of Consensus Conferences in Europe*, London: Science Museum, 1995; and Joss, S and S Bellucci (eds.), *Participatory Technology Assessment: European Perspectives*, London, University of Westminster, 2002.

⁸ United Nations Conference on Environment and Development, Agenda 21, United Nations Environment Programme (UNEP), at <<http://www.unep.org/documents.multilingual/default.asp?DocumentID=52&ArticleID=76&I=en>> (accessed 31 July 2013).

⁹ European Sustainable Cities Platform, *Charter of European Cities & Towns Towards Sustainability* (Aalborg Charter), 1994; and *The Aalborg Commitments*, 2011 at <<http://www.sustainablecities.eu/>> (accessed June 2013).

To date, over 2,700 cities and towns have signed the Charter, making it Europe's largest network of sustainable urban development initiatives. The Aalborg Commitments, agreed by the signatories on the occasion of the Charter's 10th anniversary, include a pledge to "energize decision-making" by "build[ing] participation and sustainable development capacity in the local community and municipal administration" and "invit[ing] all sectors of local society to participate effectively in decision-making".¹⁰

That there is by now broad policy support for the principle of public participation in urban sustainability management does not, however, necessarily translate into widespread practice; and while the last half of the twentieth century had seen a growing number of experiments and initiatives, there remains an evident need for conceptual and methodological innovation to establish what public participation means, how it is achieved, and what benefits are derived from it.

¹⁰ Ibid.

Example 1 – Barcelona’s sustainable action plan (Spain)

Arising from the United Nations’ Local Agenda 21 initiative, Barcelona, the capital of Catalonia, in the late 1990s embarked on a wide-ranging participatory process aimed at developing a sustainable action plan for the city. A special feature of Barcelona Agenda 21 is its explicit emphasis on the social dimensions of sustainability and on citizen participation: as part of the process of drawing up its sustainable action plan, the city authorities involved over 100 representatives of various civil society organisations (environmental and social interest groups), businesses, policymakers and academia. The participants were brought together in the Municipal Council on the Environment and Sustainability, which was given overall responsibility for defining the contents of the sustainability action plan and engaging citizens in the process. Over a four-year period (1998-2002), numerous workshops and discussion meetings were held across city districts, involving diverse community and citizens’ groups. Some of the workshops focused on discussing district-specific issues, while others considered cross-cutting themes for the city as a whole. Citizens were also invited to post proposals online. Together, the deliberations resulting from these various participatory forums informed the contents of the action plan — *The People’s Commitment towards Sustainability* — which was subsequently debated and approved by the Municipal Council on the Environment and Sustainability in 2002. Over 600 municipal organisations have since voluntarily signed the 10-year action plan, thus committing themselves to help implement the objectives contained in the plan.

The significance of this participatory process lies in the combination of: (1) engaging a broad spectrum of civil society actors in the Municipal Council, which was given responsibility for facilitating and validating the process of drawing up the sustainability action plan; (2) mobilising citizens through multiple strands of deliberation (workshops, discussion meetings, online forums, etc.) at both district level and citywide; (3) encouraging the implementation of the published plan through voluntary action by municipal and civil society organisations; and (4) lending the process overall support and legitimacy through the political process. A further characteristic is that participation was not treated as a one-off intervention, but as part of a medium- and long-term strategic planning process.

References: Municipal Council on the Environment and Sustainability;^a and Barcelona Environmental Report.^b

^a Ajuntament de Barcelona, *The People’s Commitment towards Sustainability, Agenda 21 BCN*, Municipal Council on the Environment and Sustainability, at <<http://www.bcn.cat/agenda21/compromis/compromisangles.doc>> (accessed 31 July 2013).

^b Ajuntament de Barcelona, Barcelona, *A City Committed to the Environment, Barcelona Environmental Report 2009*, URL: at <<http://www.bcn.cat/agenda21>> (accessed 31 July 2013).

DIMENSIONS OF PUBLIC PARTICIPATION

Considering the role of public participation, three interrelated questions arise: who are the “public”; what is the purpose of participation; and what are its specific functions? (This and the following sections draw on Grote and Gbikpi;¹¹ Irwin;¹² Jamieson and Wynne;¹³ Joss and Bellucci;¹⁴ Joss;¹⁵ Parkinson;¹⁶ and Renn,¹⁷ among others). These questions need to be answered not in the abstract, but in relation to the substantive issues to be addressed through participation — namely, how to define, design and implement urban sustainable development. It is one thing to establish broad consensus on the merits of urban sustainability — to render towns and cities more liveable for residents, to improve their resource efficiency and to lessen their negative environmental impacts — it is quite another to find agreement on specifics and settle on priorities within the context of complex information and competing, and often conflicting, interests. It is not just that urban sustainable development has to address concurrently and seek to reconcile, environmental, economic and social dimensions, but it has to do so in relation to complex, place-specific settings. Furthermore, for urban sustainability to gain traction, it essentially relies on political and social resonance: it requires appropriate policy steering and coordination, and depends on public engagement.

Participation, then, forms part of the governing process for urban sustainability through which normative aims can be considered and prioritised, expert knowledge can be complemented with place-specific local and “lay” knowledge, and strategies and plans can be designed, implemented and monitored. All of this relates to substantive issues: what the rationale for urban sustainability is understood to be; what issues are involved; and how these are addressed in practice. Participation, however, also relates to people — that is, it emphasises social, political and cultural engagement with urban sustainability, and how such engagement can strengthen the public accountability of planning, policy- and decision-making processes, contribute to public discourse, and enable people to play their part in urban sustainable development. Participation — as well as other “new mode” governance processes — therefore typically serves both substantive and procedural purposes: namely, to inform and improve

¹¹ Grote, JR and B Gbikpi, *Participatory Governance: Political and Societal Implications*, Opladen: Leske & Buderich, 2002.

¹² Irwin, A, *Citizen Science: A Study of People, Expertise and Sustainable Development*, London/New York, Routledge, 1995.

¹³ Jamieson, A and B Wynne, “Sustainable Development and the Problem of Participation”, *Technology Meets the Public*, Pesto Papers 2, 1998, Aalborg, University of Aalborg Press, pp. 7-17.

¹⁴ Joss and Belucci, op. cit.

¹⁵ Joss, S, “Making Technology Accountable: Citizens’ Conferences in the Era of Public Accountability”, *Diacritica*, vol. 23, no. 2, 2009, pp. 298-316; and Joss, S, “Accountable Governance, Accountable Sustainability? A Case Study of Accountability in the Governance for Sustainability”, *Environmental Policy and Governance*, vol. 20, 2010, pp. 408-421.

¹⁶ Parkinson, J, *Deliberating in the Real World: Problems of Legitimacy in Deliberative Democracy*, Oxford/New York, Oxford University Press, 2006.

¹⁷ Renn, O, *Risk Governance: Coping with Uncertainty in a Complex World*, London, Earthscan, 2008.

the contents and outputs of policy- and decision-making and public debate, while at the same time striving to support and enhance cooperation, engagement and equity among interested parties.

From this governance perspective, it is useful to discern three distinct functions of participation relating to design, policy, and public discourse processes. Participation relating to design and policy processes typically entails structured techniques integrated in formal procedures, whereas participation relating to public discourse tends to be more informal and open-ended. In practice, these functions may partially overlap. Nevertheless, in distinguishing between these core functions, key conceptual and methodological differences can be highlighted including: what the underlying rationale is for opting for a participatory process; what are the core questions and/or issues to be addressed; how participants are defined — as members of the general public, representatives of local communities, interest groups and stakeholders, etc. — and how the outputs of the participatory process are used and how they inform decision-making. In turn, these considerations inform the way in which participatory procedures should be designed and implemented.

COLLABORATIVE DESIGN

The first participatory function relates to urban sustainability design and planning processes. Here, the impetus for participation usually comes from professionals — designers, architects, planners — wishing to engage with stakeholders, such as residents, neighbourhood associations, business organisations and social interest groups. Participation has two main functions — namely, to harness the visions, knowledge and preferences of the communities that are affected by the planned urban sustainability initiative; and to gain acceptance for the planned intervention. Rather than relying solely on expert knowledge, the participatory process is designed to enable the consideration of issues relevant to the community and specific to the particular place where an initiative is planned. Furthermore, such public engagement gives an opportunity to break down barriers between planning professionals and community groups and individuals, and may thus prevent public opposition to a planned scheme. The emphasis, then, is on the co-production of knowledge and awareness about urban sustainability shared across professional and community groups.

There are several tried-and-tested collaborative planning methods. These methods have in common the use of structured techniques that involve relatively small numbers of participants (from a few dozens to in the low hundreds) engaged in short, facilitated sessions held over a day or two or as a series of events over a few weeks or months. For example, the “charrette” method brings together community stakeholders with the aim of producing urban sustainability visions and designs, and discussing implementation strategies.¹⁸ While the

¹⁸ Lennertz, B and A Lutzenhiser, *The Charrette Handbook: The Essential Guide to Accelerated Collaborative Community Planning*, Chicago, APA Planners Press, 2006; and World Bank, *Eco2 Cities: Ecological Cities as Economic Cities*, Washington DC, The World Bank, 2010, pp. 111-122.

“charrette” is typically led by professional designers, all participants are considered “designers” based on their respective community expertise.

Collaborative planning should arguably be understood as going beyond short-term, structured design processes, to be a more far-reaching interactive, social planning process occurring within and across institutional environments.¹⁹ This points to the gap that can arise between collaborative design exercises and wider interactive planning processes, especially where the former fails to capture and adequately represent the complexity and dynamics of the latter due to inadequate methodological design or organisational biases.

PARTICIPATORY DECISION-MAKING

The second function of public engagement is in relation to policy- and decision-making. Here, participation supports policy consultation and contributes to the public accountability of decision processes. Policy consultation entails the provision of information about, and the invitation for public comment on, the substance of a proposed urban sustainability policy as well as the procedures used to implement the policy proposal. It can occur at various stages of the policy process: early on, when public input is sought on the development of new policy — for example, when a city authority embarks on the process of drawing up a new sustainability plan and wishes to involve the community in identifying priorities — or at later stages, when draft policy statements are released for public comment and scrutiny, or when the finalised policy is published and the community is invited to get involved in its implementation. The potential benefits of participatory decision-making are of both substantive and procedural nature: substantively, public engagement can help improve the contents of a proposed policy by providing feedback on which aspects of the policy are considered feasible and desirable, and which aspects are deemed problematic or unacceptable. Procedurally, public engagement can enhance the transparency and accountability of the decision-making process. Information is made public, and policy- and decision-makers are prompted to be more openly accountable concerning how they formulate policies and reach decisions.

Over the years, decision-makers in various institutional settings have used a variety of public engagement mechanisms designed to support policy consultation and decision processes. These range from informal deliberative procedures, such as “consensus conferences”, “town hall meetings” and “citizens’ juries”, to formal, statutory methods in connection with public consultation and planning processes. The strength of informal, deliberative procedures stems from their ability to reveal in-depth information about public perceptions of the issue at stake and to encourage open, critical debate. Their weakness lies in the limited resonance — as they typically involve only a small number of participants — and in their non-binding nature within the decision process. On their part, formal participatory procedures derive their strength from their binding character: as part of the statutory process, they provide formal opportunities for public comment which decision-makers must consider when reaching

¹⁹ Healey, P, *Collaborative Planning: Shaping Places in Fragmented Societies*, London, Macmillan, 1997; and Healey, P, “Collaborative Planning in Perspective”, *Planning Theory*, vol. 2, no. 2, pp. 101-123.

decisions and for which they can be held accountable. Their weakness, however, lies in the often short periods of consultation available and the limited range of questions and issues open for public comment.

The stated primary purpose of collaborative design and participatory decision procedures is to open up planning and policymaking to public input and thereby to complement and enhance decision-making processes substantively (by making contents and outputs more comprehensive and robust) and procedurally (by rendering processes more inclusive and transparent). Hence, their purpose is primarily to increase opportunities for the public to have direct input into planning and policy- and decision-making. Arguably just as important, however, is the potential for institutional learning on the part of decision-makers. Such institutional “reflexiveness” increases the capacity of decision organisations for developing more in-depth understanding of, and handling capacity for, urban sustainability. This is particularly relevant, given the multiple complexities and uncertainties (technical, social, and political) involved in shaping and implementing sustainable urban development strategies and policies. Participatory processes, and similar forms of “new mode” governance, then, offer opportunities for decision organisations to develop more nuanced and sophisticated knowledge of planning and policy issues, based on the input of diverse lay and expert knowledge and the context-specific feedback of various stakeholders and members of the community.

PUBLIC DISCOURSE

The third function relates to public discourse. The purpose of participation is to stimulate, inform and support public debate about urban sustainability. From this perspective, urban sustainability is not just seen as the preserve of technical experts — designers, planners, engineers, policymakers, etc. — to be addressed through intra-institutional decision processes, but as much a matter of public interest and concern. As such, urban sustainability is essentially public in nature, since it involves and affects fundamental issues concerning the direction of public policy, the design of the public realm, and the management of public resources, goods and services. Furthermore, as sustainable urban development and management are heavily dependent on the engagement and behaviour of communities, carrying public support is seen as crucial to bringing about more sustainable urban futures. Therefore, encouraging and enhancing public discourse is arguably a key function of participatory processes. Such participation can be broader and more open-ended than procedures designed to support specific projects or formal decision processes. It may be broader in the way in which a participatory process addresses issues more fundamentally and comprehensively, unrestricted by the constraints of a particular site or initiative; and it may be a more open-ended process that allows for public engagement by multiple communities, at various sites and using diverse media, over an extended period of time.

The format of participation in this context, then, is typically less constrained by formal procedures and time limits than that of structured methods used in collaborative design and policy consulting. Here, participation may be a series of public debates, broadcasts, exhibitions, cultural events and campaigns designed to encourage the public to get involved in

learning about, debating and putting into action sustainable urban development. Rather than formal decision-making bodies, organisers tend to be from the educational and arts and culture sector, such as science museums and science centres, festivals organisers and media organisations. Needless to say, the broader, more open-ended nature of these participatory activities does not mean that these activities are less resource-intensive or complex to organise: they require just as many — if different — methodological skills and experience, as well as organisational capacity, as the more formal participatory procedures.

Example 2 – Tajimi Eco-City (Japan)

In 2003, Tajimi, a medium-sized city (with over 100,000 residents) in central Japan, came in top in the country's *Eco-City* competition for the first time. Its submission scored particularly highly in terms of the openness — centred upon regular public hearings — with which the city has developed and implemented its urban master plan as well as carried out environmental impact assessments for various municipal projects. These hearings have brought together policy specialists from various domains (planning, finance, engineering, etc.) to promote integrated policymaking and planning with focus on urban sustainability. In addition, the system of public hearings incorporates citizens' workshops. For example, residents in one district, which suffered from deteriorating river and wetland habitats due to rapid urbanisation, were enlisted to get involved in monitoring environmental quality and restoring waterways. Another example of citizen engagement in the planning process and project design relates to the construction of a new school complex. Both residents and pupils were involved in considering and choosing various sustainability features (among other design criteria), such as rooftop gardens, solar panels and water recycling.

While Tajimi has gained a national reputation for its innovative work on policy hearings and citizen participation, more generally across Japan, citizen participation and public discourse are recognised as key ingredients for effective urban sustainability management. "Citizen empowerment and partnerships" is one of the selection criteria for the national eco-city competition, which has been running since 2001. Kawasaki — the first city to be recognised in 1997 under the government's national *Eco-Town* initiative — supports the engagement of citizens' groups in urban sustainability activities; the city of Mitaka put in place a citizens' council to advise on the development of its master plan; and the city of Yamato enacted a law promoting citizen engagement in support of public community.

The integration of participatory procedures into the planning and policymaking process, coupled with municipal support for independent citizen initiatives, appears to have created an enabling environment in which social sustainability — both as process and content — can flourish. This builds on the legacy of environmental discourses in Japan dating back to the 1960s, when citizen movements formed around environmental issues and contributed to a growing culture of environmental citizenship. As such, this points to the importance of long-term strategies to support a culture of public engagement that can deliver substantive input into urban sustainability management.

References: JFS Newsletters.^c

^c Japan for Sustainability (JFS), "The 3rd 'Top Eco-City' Contest Held in Japan by the National Eco-City Contest Network", Japan for Sustainability Newsletter, no. 24, 2004, at <<http://www.japanfs.org/en/mailmagazine/newsletter/pages/027784.html>> (accessed 31 July 2013); and JFS "Japan's 'Top Eco-City' Contest Providing a Path to a Sustainable Communities", Japan for Sustainability Newsletter, no. 63, 2007, at <<http://www.japanfs.org/en/mailmagazine/newsletter/pages/027839.html>> (accessed 31 July 2013).

PARTICIPATORY DESIGN CHALLENGES

The design and implementation of a participatory arrangement have to be considered closely in terms of the intended function, particularly concerning the relationship of the arrangement to wider planning, policy or public discourse processes and their respective organisational settings. Inevitably, therefore, the question about appropriate methods and procedures is one that cannot be answered properly without paying close attention to the context. Nevertheless, the experience of participatory experiments and initiatives accumulated over decades in various organisational and cultural settings point to several common challenges that, in turn, can inform practice learning. These challenges are summarised here in three categories relating to: the internal working of participatory procedures; the integration of these procedures into planning and policy; and their wider sociopolitical resonance.

METHODOLOGICAL DESIGN

Structured participatory processes face two major challenges: first, they are typically time-constrained, with the opportunity for participants to deliberate often limited to but a few days over a relatively short period of time; and second, while participants (citizens, community groups, stakeholders, etc.) are at the centre of deliberation, they themselves have little influence over the design and conduct of the participatory process. This, therefore, creates potential power asymmetries and the risk of skewed processes — that is, the process designed to be participatory may in effect undermine that very goal both by restricting the participants' means for directing their own engagement in the process and by limiting the extent of deliberation. In turn, this can unduly influence the contents of deliberation and the related outputs produced. Consequently, methodological design should address these challenges, which is critical for the quality and credibility of participatory procedures. The following specific methodological issues have been identified as particularly important by specialists in public engagement procedures:

- *The selection of participants.* The types of participants should be clearly specified: stakeholders (interest groups, community organisations, etc.); individuals directly affected by the issue (e.g., residents); and members of the general public. Randomised selection is the preferred method if the aim is to recruit a panel of citizens; panels should be broadly representative in terms of socio-demographic criteria (gender, age, education/occupation, etc.).
- *The use of expertise.* A broad range of expert views should be made available as input into the deliberative process; the list of experts made available to participants should be validated by an independent advisory group to avoid the risk of bias; participants should have a choice about which experts/expertise to consult.
- *The choice of issue.* The issue needs to be publicly relevant by being a current topic of policymaking or public debate; a balance is needed between framing the issue sufficiently broadly to allow participants to direct the discussion, and achieving enough focus to produce outputs able to inform planning, policymaking and public debate.

- *The nature of deliberation.* There needs to be clarity about the rationale underlying the deliberative process — that is, whether the goal is to seek consensus (common interest) among participants, to facilitate negotiation (trade-off of interests), or to inquire into power relations (exercise of power/authority).
- *The process of facilitation.* The role of facilitators should be to enable participants — individually and collectively — to exercise their role without, however, being unduly steered into the process of deliberation. The facilitator primarily acts as the champion of the participants, rather than as representative of the organisers.
- *The form of output.* Where a participatory procedure informs planning or policymaking, a clear set of findings and recommendations needs to be produced and validated by the participants.
- *The agreement of “ground rules”.* From the outset, transparent rules ought to be established to ensure procedural fairness; ideally, these should be jointly agreed by the organisers and participants.

The development and implementation of various deliberative and participatory methods over the last couple of decades or so has produced a wealth of information and guidance on these and other methodological criteria. This has resulted in a certain degree of quality assurance and the emergence of technical design standards in relation to, for example, participant selection procedures, the role of facilitators and procedural fairness rules. Where a participatory procedure is to be introduced in a new policy or organisational context, it may be advantageous to deploy such existing “tried-and-tested” methods, as this will help secure the legitimacy of the process and build organisational capacity.

POLICY INTEGRATION

Another challenge facing formal participatory procedures concerns their link to, and integration into, policymaking and planning. If a procedure is too remote either thematically (because the topic considered has little relevance) or instrumentally (because there is no connection with corresponding decision-making processes), then this reduces the likelihood of the procedure having any significant impact on policy and planning. In turn, this devalues the procedure and undermines the participatory efforts. Hence, it is imperative for the organisers of a participatory procedure to be specific about what link — if any — the procedure has to policymaking and planning; and organisers should be accountable to participants for the way in which the outputs of deliberation will be used. The question of integration is necessarily one which is context-specific — that is, it has to be clarified in relation to individual policy and planning processes.

The *problematique* of integration has two interrelated dimensions: one concerns the appropriate distance of a participatory procedure to formal decision-making processes; the other concerns the appropriate point along the formal decision-making trajectory at which the participatory procedure should intervene. Proximity to formal planning and decision-making processes increases the potential for the outputs of a participatory procedure to inform, and

be able to influence, the deliberations surrounding the formal planning and decision-making processes. At the same time, too close a relationship could undermine the value and integrity of a participatory procedure in case it becomes emasculated by the formal decision-making process. Realistically, however, in most cases the challenge for organisers of participatory procedures consists of the opposite — namely, trying to bring these within the sphere of formal planning and decision-making.

The question then arises at which point this should be done most appropriately: if a participatory procedure takes place too early in the policy and planning cycle, there may be little resonance with wider discourse and outputs risk going unnoticed; if it is too late — when positions have already been taken and options narrowed — then the participatory procedure's capacity for providing design inputs and informing policy debate may be limited. The point of intervention, therefore, needs to be considered carefully; and in doing so, one needs to bear in mind what the scope of deliberation and who the intended audience are meant to be. “Upstream” intervention, early on in the planning and policy process, may be appropriate if the goal is to stimulate a broad discussion of an issue and to scope various possible development options. For example, a participatory procedure on sustainable urban transport could at this early point consider a range of possible socio-technical systems and policy options — for example, from a focus on regional transit planning to a focus on improvements to neighbourhood transport system — and evaluate various scenarios in terms of economic feasibility, social relevance and policy implications. The target audience at this point would likely be diverse, including researchers, policy analysts, various interest groups as well as decision-makers. Intervention further “downstream” — when the policy options are narrowed down through the political decision-making process and when planning has reached advanced stages — may be suitable if the objective is to contribute a specific assessment or consultation input into the policy and planning process. Here, the participatory procedure may focus on gauging whether a proposed policy — say, the introduction of a congestion charge to reduce private car use in the city centre — is socially acceptable and establishing how best to achieve implementation of the policy.

The issue of integration is made further complex by the modes of governance involved in the management of urban sustainability: policy- and decision-making typically transcends any one single institution, policy area and jurisdictional domain; instead, it often involves diverse actors engaged in elaborate networking arrangements, such as public-private partnerships. In the governance literature, participatory procedures are seen as a way of rendering such governance arrangements more transparent, accountable and inclusive, by opening them up to public scrutiny and giving greater “voice” to stakeholders, interest groups and citizens. However, it cannot be taken for granted that the use of a participatory procedure *per se* improves the processes and contents of deliberation; this depends on how well the procedure relates to, and is integrated into, the governance process. Applied to the management of urban sustainability, special consideration is required concerning large sustainable infrastructure and planning projects. These tend to be technically highly complex and involve particularly elaborate — and often seemingly impenetrable — governance structures and processes. This makes the integration of participatory procedures especially challenging.

PUBLIC RESONANCE

The design of structured participatory procedures as input into governance processes throws up a further challenge: how, at the same time, to make them relevant to wider public discourse. This is not just a question about how best to amplify and communicate the discourses generated within the participatory procedures so that these may inform wider public debate. (The answer to this lies at least partly in how to achieve media resonance.) It is also a question about how resonant these discourses are of political processes in the wider public sphere. The challenge here consists in the potential artificiality of the participatory procedures and the discourses they produce. Most formal participatory procedures are constituted and designed in ways which are arguably remote from the political deliberations and social discourse that occur in the wider public sphere. As purposeful, highly structured interventions in governance processes, they typically seek to render deliberation “rational” and “robust” — based on optimal information and knowledge input and controlled, facilitated deliberation techniques — and emphasise consensus as the goal and output of deliberation. The effect is that the essence and dynamics of “real” political discourse and action — entailing negotiation, bargaining, consultation, lobbying and public contestation — may be left outside participatory procedures.

Consequently, it is important to recognise that structured participatory procedures may be fundamentally different from deliberation and participation within the wider public sphere. Such procedures may produce useful insights into public perceptions and comparative information about various policy options for, say, future sustainable transport based on a consensus-based deliberation process; but it may not adequately capture the contestation of political interests and the dynamics of public discourse surrounding ongoing conflicts over major transport infrastructure projects and planning processes. This is not problematic, as long as this difference is recognised. It would be problematic, however, if the assumption is made that the deliberation generated within structured participatory procedures necessarily mirrors wider sociopolitical discourse. It would be further problematic if these structured procedures were assumed to be able to substitute for wider public discourse.

Example 3 — St. Davids Eco-City (UK)

St. Davids, the United Kingdom's smallest city, has gained a reputation for its urban sustainability practices and policies. Following a sharp economic decline in the late 1980s/early 1990s, the port city began to shift its focus to innovation in environmental sustainability and eco-tourism. This work was led by a voluntary group of civil society actors, including at its centre, the Eco-City group. The latter is made up of representatives of local business groups, the city and county councils, the National Park, as well as individual residents. The group holds monthly meetings and communicates its activities through a social media site. In 2004, the group secured a funding of more than GBP100,000 from the National Lottery based on its proposal to transform St. Davids into a carbon-neutral city. The programme of work has to date focused on the solar heating and photovoltaic installations, water conservation measures as well as recycling initiatives. More recently, a biodiesel pump was installed (using locally sourced biodiesel) and a car-sharing scheme was introduced. The Eco-City group, supported by a part-time manager, runs an education and tourism programme, attracting an average of half a million visitors annually. Revenues from this are reinvested in new sustainability technology innovation, including the recent testing of a tidal turbine which, if successful, could provide 100% renewable electricity for the city. The first "St. Davids Eco City Week" of events, talks and workshops was held in February 2010.

As a community initiative, St. Davids Eco-City is driven by collaborative planning and participatory action open to all residents and civil society groups. While political representatives are involved in the Eco-City group, the initiative appears to have no direct anchoring in the political process. Consequently, external funding by the National Lottery was critical in getting the initiative off the ground; and the realisation of the various projects has since relied on the support by volunteers.

CONCLUSIONS

The focus of contemporary urban sustainable development initiatives can sometimes appear to be almost exclusively on technological issues — renewable energy systems, recycling processes, public transit innovation, etc. — and related technocratic management led by professional experts and planners. Arguably just as important, however, are the issue of social sustainability, and the agency of citizens, community groups and civil society organisations. From a substantive perspective — defining and prioritising urban sustainability — as well as from a procedural perspective — realising community engagement — the social dimension of sustainability is critical to the potential effectiveness of sustainable city initiatives. And yet, this dimension often remains elusive due to the predominant technocratic approach to urban sustainability governance.

One of the challenges of opening up urban sustainable development to public participation is to define and present urban sustainability in a socially relevant and accessible way. For example, the issues of sustainable food, urban green spaces and affordable public transport are likely to engage the public directly *and* can be shown to have significant environmental benefits. More technical and far-ranging issues — such as how to invest in infrastructure improvements and tackle global climate change — have a better chance of engaging the public if they can be shown to be relevant to particular communities and locations. Such an approach then also provides an opportunity to situate place-specific concerns within a wider “bioregional” context, to highlight the interdependence of urban sustainability with regional and even global developments.

Another challenge is to overcome an overly monolithic view of “the public” and “the community”. Rather, it is more productive to consider various “publics” and “communities” as containing a plurality of interests and comprising a range of stakeholder groups. This in turn calls for tailor-made engagement processes to take into account the types of participants to be involved. This may not in itself resolve the difficulty of public participation in planning, but it at least suggests more differentiated and responsive engagement modes.

When public participation is used as part of the process of governing for urban sustainable development, its function has to be made explicit which, in turn, has ramifications for the methodological design of participatory procedures. There is a place for structured collaborative planning and formal consultative processes, as there is a place for open public discourse; but these different functions should not be conflated. The former can be useful in structured processes for uncovering public issues and insights of which designers, planners and developers might otherwise be unaware. The latter are important to ensure that decision-makers are held to account and that urban sustainability is subject to informed and robust public debate.

As such, public participation in urban sustainable development might be productively conceived of as being generated across multiple deliberative arenas: some more formal, others more informal; some more place-specific, others more large-scale; some thematically more focused, and others more exploratory and future-oriented. The different methodological and practical requirements for each of these arenas need careful consideration. Finally, particular attention should be paid to how synergy can be created between these various participatory arenas, so as to strengthen public engagement in the governance of urban sustainability.

Singapore, an Eco-city

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With a population of 5.3 million today, Singapore has achieved rapid economic growth since the city-state gained internal self-government in 1959, when it had a population of approximately 1.6 million. The country's gross domestic product has increased 13 times in real terms to approximately S\$60,000 per capita today from 1961.² However, the Singapore story is not just about its economic growth.

Significantly, Singapore was able to grow its economy, while protecting its environment, and providing for a high quality of life. Aside from economic growth, Singapore is also ranked well in various international surveys on liveability and sustainability. Singapore is Asia's greenest metropolis according to the 2011 Asian Green City Index by the Economist Intelligence Unit (EIU). The Mercer's Eco-city rankings 2010 also ranked Singapore among the top 25 cities worldwide in view of water availability, water portability, waste removal, sewage, air pollution and traffic congestion.

Indeed, the story of how Singapore transformed itself in one generation from a Third World to a First World nation, and in doing so uplifted the living conditions of its people, grew prosperous and became clean and green, is Singapore's journey towards becoming an eco-city. This article shares Singapore's journey in the three key areas of housing, economic development and environmental protection, focusing particularly on how it overcame the challenges faced in the early years, which could be of interest to many Asian cities.

SINGAPORE'S CHALLENGE AS A STATE AND CITY

To understand Singapore's development path, it would be useful to first know where it started out. Unlike other cities in bigger countries, Singapore is both a sovereign state and a city. Founded by the British as a trading port in 1819, Singapore attained self-government in 1959, followed by full independence on 9 August 1965.

The period from 1959 to 1965 was a critical period for Singapore. As a new sovereign state, it had to grapple with the challenges of a country — building up its defence, ensuring

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² Centre for Liveable Cities, Economic and Development Board and JTC Corporation, *Industrial Infrastructure, Growing in Tandem with the Economy*, Singapore's Urban Systems Studies Booklet Series (Singapore: Cengage Learning, 2013).

economic viability, and creating a cohesive nation from its diverse and largely migrant population. At independence, Singapore was made up of Chinese (62%), Indians (16%), Malays (14%) and Europeans and others (8%). Given this racial and religious diversity, and against the backdrop of economic uncertainty, social unrest and riots were widespread.

As a city, Singapore's environment and quality of life then were no different from many other developing cities at that time. The majority of Singapore's population in the 1950s lived in slums and squatter areas with poor sanitation and ventilation, which also posed safety, fire and public health hazards. Related social problems included a lack of modern health, educational and cultural facilities, poor public transport, lack of jobs, vice and crime, and class and ethnic divisions.

ERADICATING SLUMS AND PROVIDING A GOOD QUALITY OF LIFE

The need to provide for proper housing and create jobs were the two most critical challenges faced by Singapore at the time. With some two-thirds of Singapore's approximately 1.6 million population crowding in inner-city slums and in squatter settlements on the city's fringe, and a population growth rate of 4.4%,³ one of the highest in the world then, overcrowding was an extremely urgent problem.

To tackle this challenge, the Housing Development Board (HDB) was set up in February 1960 with a mission to build affordable public flats on a large scale as quickly as possible. The setting up of HDB was significant, as it was the very first public institution established by the Singapore government after it gained internal self-government. In many ways, this signalled the government's No. 1 priority at the time.

To keep cost low, HDB concentrated on building basic blocks and flat designs that could be easily and cheaply replicated. Through its large-scale programmes, HDB was able to keep its cost of developing public housing low, benefiting from economies of scale and a relentless focus on efficiency and cost control. While the flats were small and relatively simple, they came with modern sanitation and were a significant improvement compared to the living conditions in squatters. Apart from housing, HDB also built shops, amenities and green spaces to serve the total needs of the residents.

In the first five years of its formation from 1960 to 1964, HDB built some 44,000 housing units, which were significantly more than the 23,000 units built by the housing authority under the colonial government in the preceding 32 years. While it would take quite a number of years before the housing challenge was completely addressed, the Singapore government had by then created a strong public institution through the HDB, and was well on its way to solving the housing shortage.

In the early years, HDB rented out the completed flats at an affordable rate, following the conventional inherited model of rental public housing. The model shifted in 1964 when the Singapore government identified home ownership as a key policy objective in building up

³ Barbara Leitch Lepoer, ed., "Population", *Singapore: A Country Study* (Washington: GPO for the Library of Congress, 1989), at <<http://countrystudies.us/singapore/14.htm>> (accessed 10 Jan 2014).

a sense of nationhood, which was essential for a state made up of a diverse and largely migrant population. As the first prime minister of Singapore, Mr Lee Kuan Yew, recalled, “If every family owned its home, the country would be more stable...I believed this sense of ownership was vital for our new society which had no deep roots in a common historical experience.”⁴

With this thinking, the responsibilities placed upon HDB increased. It was no longer just about building flats that enabled people to relocate from slums and squatters, but also allowing them to own their own homes at the same time. The crux was to develop a workable financing and ownership model. To this end, Singapore’s effort to create jobs and grow the economy was starting to bear fruits. This was critical as it provided the government the required funding needed to sustain its public housing programme. Conversely, providing employment gave people the means to pay for their flats.

Several measures were introduced to encourage home ownership. Targeting the lower- to middle-income groups, HDB flats were sold at a price below market rates. HDB also made available low-interest loans with repayment periods up to 15 years. From 1968 onwards, the Singapore government further allowed the use of Central Provident Fund (CPF), which is a form of compulsory social security savings, to pay for HDB flats. Together, these measures facilitated the home ownership scheme to take off in Singapore.

Today, more than 80% of Singapore’s population live in HDB flats and approximately 90% of them own their homes. Over the years, HDB has built some 900,000 flats across 26 towns and estates. HDB towns are designed to be self-contained, supported by commercial, industrial, institutional, recreational and communal facilities. Over the last 50 years, HDB has transformed Singapore’s housing landscape from shantytowns to quality homes that meet the aspirations of an increasingly affluent society. This is achieved through a committed core public housing policy to provide new quality flats as well as its upgrading programme to maintain old flats. HDB’s success was recognised by the United Nations (UN) when it conferred HDB the UN-Habitat Scroll of Honour for providing “one of Asia’s and the world’s greenest, cleanest and most socially conscious housing programmes”.⁵

CREATING JOBS AND GROWING THE ECONOMY

Aside from housing, the other key challenges faced by Singapore were to create jobs and to grow the economy. With rapid population growth, Singapore’s entrepôt trade economy was not able to grow fast enough to generate sufficient employment. The situation was compounded when Britain announced in 1967 that it would withdraw its troops from Singapore. At that time, the British armed forces accounted for an estimated 18% share of Singapore’s GDP, and an equally significant proportion of jobs. Given this, the British withdrawal would

⁴ Lee KY, *From Third World to First: The Singapore Story, 1965-2000* (Singapore: Times Media and The Straits Times Press, 2000).

⁵ Housing Development Board press releases, “HDB Wins Prestigious 2010 UN-Habitat Scroll of Honour Award”, 22 September 2010.

potentially cripple the economy. With unemployment hovering around 10%, there was a pressing need for the Singapore government to provide jobs quickly, in the face of political and social unrest.

Following a short-lived merger with Malaysia between 1963 and 1965, the Singapore government adopted a strategy of export-oriented industrialisation. Singapore opened up its economy and actively welcomed foreign direct investments. It is important to note that this was a contrarian strategy then. At a time when many colonised countries first gained independence, many believed that foreign investment was neocolonialism, a continuation of colonialism in economic form. Consequently, the conventional thinking then was for countries to build up their own national industries, and to block off the entry of multinationals. On the other hand, Singapore openly courted these multinationals to set up operations in Singapore. Given Singapore's lack of critical mass and limited domestic market, this contrarian strategy towards a free market economy was the only practical approach.

The Economic Development Board (EDB) was set up in 1961, as a second key public institution after HDB, to create jobs by attracting foreign direct investments into Singapore. One of the first tasks of EDB was to set up Jurong Industrial Estate (JIE) at the western part of Singapore. This was an ambitious plan that involved transforming some 5,000 hectares of rural swamplands at Jurong into a new industrial estate to support Singapore's industrialisation. At a time when Singapore was a relative unknown in industrial development, EDB needed to build ahead of time, so as to create a "plug-and-play" industrial environment ready for investors. EDB pursued American and European multinationals tirelessly, and by the late 1960s, it had achieved some successes with several major companies opening plants in Singapore.

The concept behind JIE was to centralise heavy industries such as steel mills, timber and shipbuilding in the early days at one location in the Jurong area. This approach separated industries from residential estates, hence reducing the level of air pollution affecting the residential areas. In addition, by clustering the heavy industries, it allowed for environmental protection services, such as pollution control infrastructures to be provided economically. Greening was also introduced in JIE where all factories had to plant trees and green their grounds before they could operate their businesses.⁶

Throughout its economic journey, Singapore implemented flexible and pragmatic economic development strategies that would work to its advantage as the global economic circumstances changed. After the labour-intensive phase in the 1960s, the economy evolved to a skill-intensive phase in the 1970s, to a capital-intensive phase in the 1980s, to a knowledge-intensive phase in the 1990s, and since 2000, an innovation-driven phase.

GROWING WHILE PROTECTING THE ENVIRONMENT

With rapid urbanisation and industrialisation throughout the 1960s, there was a very real chance that environmental protection would take a back seat in Singapore's development.

⁶ Lee, *From Third World to First: The Singapore Story, 1965-2000*.

Critically, the Singapore government envisaged that having a clean and green environment was just as important as economic development. A good environment attracts investments and talents, which support economic growth. Economic growth in turn generates resources required for investments in environmental infrastructure. Mr Lee Kuan Yew explained: “After independence, I searched for some dramatic way to distinguish ourselves...I settled for a clean and green Singapore...for if we had First World standards, then businessmen and tourists would make us a base for their business and tours of the region.”⁷

To this end, Singapore adopted two key strategies. First, to put in place stringent systems and controls towards pollution control, which is extremely important as it industrialises. The second was to relentlessly clean up and green Singapore.

As the foreign multinationals started their factories in Singapore in the late 1960s, the Singapore government knew that the environment could not be sacrificed in the rush for rapid industrialisation. In particular, air pollution could have severe long-term effects on the health of the people. To tackle pollution, the Anti-Pollution Unit (APU) was quickly set up as part of the Prime Minister’s Office in 1970 to plan the locations of industries and control air pollution. Among its many tasks, proposals for new industries had to be assessed by the APU on their pollution impact, and were only approved if their impact could be mitigated with adequate pollution control measures.

Soon after, the Ministry of Environment (ENV) was set up in 1972 to bring together all aspects of environmental issues, including public health, pollution control, sewerage, drainage and irrigation, which had resided in multiple other government departments. It was significant that Singapore was then one of the first in the world to have a dedicated ministry for the environment.

While working towards pollution control, ENV also embarked on the massive task of cleaning up Singapore’s land and water. This included a wide range of separate but inter-related tasks, such as provision of reliable public cleansing and refuse disposal services, enforcement against littering and dumping, and resettlement of street hawkers. To carry out its work, ENV invested heavily in environmental infrastructure. For instance, ENV progressively rolled out a comprehensive network of sewers, based on the Sewerage Master Plan, which drastically cleaned up the country and reduced waterborne diseases. The development of the environmental infrastructure, together with the large-scale public housing programme which enabled squatters and slum-dwellers to be resettled in flats with proper piped water, electricity and sanitation, progressively improved the living environment in Singapore.

The successful clean-up of Singapore’s land and water laid the cornerstone for Singapore to tackle its other key environmental challenge — water scarcity. Perhaps somewhat surprising, Singapore is ranked as one of the countries with the greatest freshwater scarcity in the world in the 2006 United Nations World Water Development Report. This is despite

⁷ Centre for Liveable Cities and National Environment Agency, *Sustainable Environment, Balancing Growth with the Environment*, Singapore’s Urban Systems Studies Booklet Series (Singapore: Cengage Learning, 2013).

abundant rainfall of approximately 2,400mm per year.⁸ The reason is because Singapore has neither much groundwater nor natural fresh water bodies to begin with. Land use for capturing and storing rainwater is also limited by its limited land area. Ensuring a stable and adequate supply of water is therefore a key national challenge. Historically, Singapore was heavily reliant on Malaysia for imported water as its domestic water sources were not able to provide enough water for the needs of a growing population and industry.

The cleaning up of Singapore and its role in expanding Singapore's water resource was explained by Mr Lee Kuan Yew in his memoirs, from *Third World to First: The Singapore Story, 1965-2000*, "One compelling reason to have a clean Singapore is our need to collect as much as possible of our rainfall of 95 inches a year. I put Lee Ek Tieng, a civil engineer, then the head of the Anti-Pollution Unit, in charge of a plan to dam up all our streams and rivers. The plan took about 10 years to implement. He had to ensure that all sewage, sullage and other soiled water from homes and factories emptied into the sewers. Only clean rainwater runoff from the roofs, gardens and open spaces was allowed into the open drains that flowed into dammed-up rivers."⁹

The Public Utilities Board (PUB) is the public institution responsible for Singapore's water resources. Alongside the expansion of domestic water sources through the cleaning and expansion of water catchment, PUB also experimented with treating and reclaiming water from the mid-1970s. However, as technology was not ready, Singapore had to wait another 20 years before water reclamation became a viable option. Following extended trials and stringent tests, large-scale water reclamation was carried out, leading to the launch of "NEWater" in 2002. This breakthrough was a key step that allowed Singapore to close its water loop.

Today, Singapore's sustainable water supply is the result of a tightly integrated water management system that uses advanced technology to mitigate Singapore's physical limitations including water reclamation and seawater desalination. The governance of Singapore's water management policies has also evolved over the last five decades along with changes in political context and national priorities. In the early days, policy initiatives were very much top-down and visionary versus institution-driven these days. As Singapore moves steadily towards water resilience and self-sufficiency, water is no longer regarded as a scarce resource but as an asset for the community to enjoy. The private sector and community are also encouraged to take a more active role in water management instead of leaving it solely in the hands of the Government.

REFLECTIONS

What can we learn from Singapore's experience? Two key common principles stand out in all three case studies of housing, economic development and environmental protection — dynamic urban governance and integrated master planning and development.

⁸ Centre for Liveable Cities and Public Utilities Board, *Water; From Scarce Resource to National Asset*, Singapore's Urban Systems Studies Booklet Series (Singapore: Cengage Learning, 2012).

⁹ Lee, *From Third World to First: The Singapore Story, 1965-2000*.

Dynamic Urban Governance

At independence, national survival was at stake. While the overriding task at hand was to create jobs and to provide proper housing, Singapore's limited land resources meant that it was necessary to balance both economic and environmental considerations. With limited land, any form of pollution in any part of Singapore would easily affect the entire island. It was not possible to adopt a "develop first, and clean up later" approach.

This sense of urgency in dealing with the pressures of growth, while retaining the commitment that economic progress could not be made at the expense of the environment, demonstrated the vision and direction set by the first-generation Singapore leaders. They took a long-term view in assessing what was necessary for the good of the country.

Where necessary, the leaders were also not afraid to back up their commitment, as shown by the setting up of the APU directly within the Prime Minister's office. This action sent a clear signal to the rest of the government and to the people and private sector.

Vision and direction alone cannot get things done. The Singapore government systematically created strong public institutions. It is these action-orientated institutions that create and implement policies, and in doing so make the vision and direction from the leaders happen. The setting-up of the HDB first in 1960 followed by EDB in 1961, and the effective way in which these agencies executed their tasks, exemplifies this.

Since then, many other public institutions were gradually formed. These institutions are characterised by strong internal capacity based on professional expertise. Once built up, strong public institutions would have the ability to innovate systematically while executing their work, thus creating a virtuous cycle. The water story of Singapore is a good example of how PUB was able to innovate in addressing Singapore's water challenge. Collectively, strong public institutions played a key role in the development of Singapore.

Integrated Master Planning and Development

The other important aspect of Singapore's experience is the way in which the public institutions worked together in a tightly integrated manner. Underpinned by dynamic urban governance, public institutions take a long-term view towards the challenges at hand, and worked in an integrated way to plan and develop Singapore.

One such good example is Singapore's integrated land use planning process. Given its limited land resources, Singapore takes a long-term view to ensure that each and every piece of land is put to its most optimal use. At the strategic level, Singapore's development is guided by the Concept Plan, which sets out Singapore's land use strategy over a 40 to 50-year time horizon. First started in 1971, the Concept Plan process has been institutionalised and is reviewed regularly every 10 years. The Concept Plan exercise brings together almost all government institutions in projecting their long-term land and infrastructure demands. In doing so, the exercise ensures that Singapore has the necessary land resources to develop and grow over the long-term, and potential trade-offs involving competing land needs are raised and addressed, resulting in an overall plan that is assessed to be most optimal for the country as

a whole. The strategic directions in the Concept Plan are then cascaded to the Master Plan, which guides development over the short to medium term.

Together, the Concept Plan and Master Plan play a key role in ensuring a good living environment. Such a rigorous planning system ensures that environmental infrastructure like sewerage and drainage is planned and coordinated with development, such as the opening up of new housing and industrial estates. The long-term projections also allow land to be set aside for critical infrastructures such as waste disposal and incineration facilities to support future growth. Areas that are assessed to be significant from ecology and biodiversity standpoint are also safeguarded, in consideration of overall land needs.

Further, with such an integrated planning process, it is possible to plan for compatible uses to be sited close together while conflicting ones are spaced apart. For instance, heavy industry users which are potentially pollutive are clustered with utility users such as power plants, and kept away from population centres. On the other hand, cleaner industries that are not pollutive can be sited nearer to residential areas to provide employment opportunities hence minimising transportation needs. Such integrated planning allows Singapore to allocate its limited land resources efficiently, and minimises potential downstream issues.

CONCLUSION AND RELEVANCE FOR ASIA

Much of Asia is aspiring to improve their quality of life through providing proper homes, basic access to water and sanitation, and social mobility and prosperity at the same time while having to deal with rapid population growth in cities. This was exactly Singapore's development pathway over the past 40 to 50 years.

While most other countries are far larger, and arguably have more complex governance structures, much of the required actions to provide for a good quality of life, economic growth, and to protect the environment will have to be taken at the city level. This is increasingly so with urbanisation, as a greater proportion of population in developing countries move into cities. To this end, the challenges faced by many of these cities are no different from the conditions faced by Singapore in its early stage of development. Singapore's experience can therefore be a useful reference.

Singapore did not deliberately aim to be an "eco-city" from the beginning. After gaining independence in 1965, Singapore had to take immediate steps to resolve overcrowding, unemployment and other urgent problems in order for the nation to survive. The early leaders learnt from the mistakes that other cities had made and avoided them so that Singapore got started on the right footing.

Consequently, Singapore adopted a clean and green strategy to differentiate itself from its neighbouring countries in a hope to attract investors for economic growth. Singapore also created a distinguished public housing programme that allowed its citizens to own the flats unlike many global cities where public housing is predominantly rental. The aim was to go beyond the provision of basic shelter to provide quality housing that residents could proudly call home and a living environment that would nurture the development of vibrant and cohesive communities.

Specifically in the area of environment, it is important to point out that in the 1960s when Singapore first started its journey, the concept of “environment” was one that focused on “basic” issues such as public health, cleanliness and pollution control. This is in contrast to the current discussion on environment, which often centres on climate change-related issues. Nonetheless, many developing cities today continue to face challenges relating to “basic” environmental issues and therefore would find Singapore’s experience useful. Getting these environmental fundamentals sorted out can also serve as building blocks to cover other aspects of environmental sustainability.

The Singapore experience illustrates that objectives of quality of life, economic growth and environmental protection can be achieved with dynamic urban governance, and integrated master planning and development.

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Urban Planning for Sustainable Community Development in Japan: City of Musashino, Tokyo

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INTRODUCTION

With urbanisation occurring at a rapid pace all over the world, governments, industries and civil society have been forced to give serious attention to the so-called “urban problems”, such as high population density, high residential housing costs, loss of greenery, air and water pollution, traffic congestion, as well as widening income and social inequalities and inadequate job opportunities, and in many developing countries, limited access to public services such as drinking water, electricity, sanitation, health care and education. It is noteworthy that people have shown acute awareness and concern of these urban problems in recent years, partly in response to the gravity of problems observed in their daily lives in cities and partly because of the changing values and priorities of the better-educated population in the rapidly expanding urban middle class. People who were born in the second half of the previous century have become increasingly conscious of their environmental and civil rights, which are also issues that re-election-seeking politicians in many societies today under the democratic governance system are sensitive to. The rapid penetration of information and communication technology (ICT) such as the Internet, Facebook and Twitter among urban population in recent years has also contributed to increased public awareness of rights and responsibility to solve urban problems in their daily lives and the problem of environmental degradation.

Japan is no exception to this worldwide trend of rapid urbanisation, along with the associated problems. Both the central and local governments of Japan are forced to place urban issues as their top policy agenda and respond squarely to the urban population’s mounting demand to improve the physical and social infrastructure as well as public services. Urban management is thus of crucial importance in this country, especially with increasing fiscal deficits amid rising unemployment and social security payments, which are similar situations in European, North American and other developed countries.

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In addition, like other developed countries, an ageing population has emerged in recent decades as another critical feature of Japan, along with problems of elderly care by the family and community as well as higher health expenditure and social security payment at local and national levels. Even at the global level, the issue of ageing populations will become far more serious, as the aged population (over 60 years old) grows faster than the total population, whereby the ratio will increase from one in every nine persons who are aged 60 or over in the world today to one in every five persons by 2050.² These urban challenges have grown in severity especially in small and medium cities (SMCs) with the outmigration of young males and females to megalopolises in search of better education, health care and other social services as well as better job opportunities and wider choice of cultural attractions. Most SMCs also find it extremely difficult to improve their aged physical and social infrastructure due to declining tax revenue as a result of fewer business investments, higher unemployment, and an increase in population in the poor and vulnerable group. It is estimated that nearly two-thirds of the SMCs in Japan fall in the same predicament, particularly since the lost decade of the 1990s and after the Great East Japan Earthquake/Tsunami and Tokyo Electric Power Company's nuclear disasters in north-eastern Japan in March 2011.

As discussed at the World Cities Forum 2012, while it is true that “cities need not be the problem; rather, a fundamental paradigm shift is necessary to view cities as potential and strategic vehicles for resource-optimization, and engines of innovation and sustainable growth”, and “with smarter and greener technology, cities can aim to reduce their carbon footprint significantly through accessible, affordable and sustainable integrated urban solutions, to achieve a high quality of life and a more inclusive community for all”, it is equally a reality that most SMCs, not only in Japan but elsewhere around the world, are struggling hard to stay competitive with megalopolises and to get out of the downtrodden path of the past few decades, having extreme difficulty transforming themselves “into sustainable centres of global networks, economic vitality and talent pools for the future”.³ Under these pressing conditions prevailing in Japan and elsewhere in Europe and other developed regions, it is encouraging to observe how the City of Musashino — which could be a useful case study — with a population of about 140,000 people and a high proportion of its population being over 65 years old has continued tirelessly since 1976 to build an economically, socially, environmentally and culturally sustainable urban community in the western corner of the large metropolitan area of Tokyo.

The City of Musashino has been enjoying its reputation as Japan's most attractive and liveable city for the last few decades. The Musashino Approach, as coined by the Japanese, has earned high repute because of the city's relatively high per capita income, low unemployment and poverty ratio, and high-quality public services for education, health and social benefits as well as social protection for the physically and mentally handicapped, in addition to its acclaimed extensive greenery coverage despite the high level of urbanisation and proximity

² United Nations Department of Economic and Social Affairs (UNDESA), *World Population Ageing*, based on its Population Division's medium projection scenario, *World Population Prospect: The 2010 Revision*.

³ World Cities Forum, *World Cities Summit 2012 Announcement*, p. 1.

to the downtown hub of Tokyo. Furthermore, the city is well known over the second half of the last century for its active citizen participation in municipal activities and decision-making processes that directly impact daily lives. Attaining these achievements while being the best at retaining municipal fiscal balance among all neighbouring suburban cities of Tokyo is an admirable feat, which will be discussed later. It is no exaggeration to say that the excellent performance of the municipality of Musashino is the result of a well-balanced combination and synergy of political leadership of successive mayors (top-down approach) elected by the voters of the city through the years, and a high sense of ownership among the citizens of Musashino, who have upheld for many decades the principle of TAP4E4S as the guiding spirit of urban management (bottom-up approach).⁴ It seems evident that if either of the two-pronged fundamentals had been missing and had it not been for the principle of TAP4E4S so ardently adhered to, the people of the City of Musashino would not have succeeded in building a relatively high-quality sustainable community, as it is today.

The purpose of this paper is to discuss the key features of the Musashino Approach to sustainable community-building, analyse the major factors that contribute to the high sense of ownership embraced by all stakeholders living in the city, and present the major challenges faced by city managers and citizens particularly in further enriching the Musashino Approach in this era of advancing economic, social and political globalisation and increasingly diverse values worldwide. It is hoped that this analysis of the genesis of the Musashino Approach, how it evolved over time and the anticipated challenges of the City of Musashino in the coming decades may present some interesting lessons for SMCs in East Asia and other parts of the world in learning the Musashino Approach to urban planning for building economically, socially, environmentally and culturally sustainable communities.

NATIONAL DEMOGRAPHIC AND POLICY CHANGES: IMPACT ON THE CITY OF MUSASHINO

The City of Musashino, being part of the larger Metropolitan Government of Tokyo and part of Japan, has been enormously affected by the national demographic and policy changes at the provincial and national levels. These changes have brought both favourable and unfavourable impacts on the citizens' lives in Musashino City. An important positive impact is the spillover effects of the rapid economic growth of Japan and Tokyo Metropolis, with its key attributes such as a higher standard of living, better educational, health and social security programmes as well as access to a variety of cultural and recreational facilities and programmes. One of the unfavourable impacts is, notably, the rapid pace of urbanisation, with the associated problems of traffic congestion, noise, environmental deterioration, widening income disparities, higher

⁴ TAP4E4S4 stands for transparency, accountability, policy (P1), planning (P2), participation (P3) and partnership (P4), empowerment (E1), equity (E2), efficiency (E3), effectiveness (E4) and S4 (economic, social, environmental and cultural sustainability), the basic philosophy and values that have guided the urban management and development in the City of Musashino since 1976, and are codified as the Principle of Self-Governance, endorsed by the citizens and their City Council.

housing costs and possibly rising social crimes. On top of these, the ageing of the overall population of Japan and Tokyo Metropolis is also reflected in the population composition of the City of Musashino, with related problems such as higher health and social security expenditure per capita, which have an impact on the municipal finance.

Japan, in its long history, has now entered the stage of depopulation since 2008, and it is estimated that the population will reach 86 million in 2050. With a low birth rate and declining population, Japan has been experiencing accelerated population ageing. In 1945, the proportion of its total population aged 65 years and over stood at 5.1%, but it had reached 23.1% in 2010, while the proportion of its total population aged 15 years old and below had dropped from 36.8% to 13.0% during the same period. If the Japanese family/marriage preferences (between 1965 and 2010, the percentage of single males in the 35-39 age group rose from 4.2% to 35.6%) and its population and immigration policies see no changes in the foreseeable future, the proportion of the population aged 65 years old and over will rise to 39.6% by 2050, and that of aged 14 and below will decline from 13.0% to 8.6% during the same period, and this will result in raising the dependency ratio from 36.1% to 48.2%, implying that one person of productive age (in the 15-64 age group) will have to support nearly one dependent (the 0-14 age group and those aged 65 and over).⁵ Musashino City has long been confronted with a similar trend of population changes (Table 1).

Confronted with an ageing population, shrinking labour force, higher wages, lower economic growth at home and growing competition in the international market during economic globalisation in the 1990s-2000s, it became obvious that the Government of Japan (GoJ) should make immediate adjustments in the economic and social policies to shift towards deregulation and privatisation of domestic businesses, and trade and investment liberalisation at home, but it has failed to do so in reality. The GoJ did not deal squarely with those reforms that were essential to restructuring the economic and social foundation due to various factors. An obvious attributing factor is the so-called traditional double TL (too little, too late) policies yielding to the “strong” pressures of the vested interest groups that had enjoyed windfall profits and other benefits under protracted policies of protectionism in exchange for handsome political contributions to the party in power. It was only when former Prime Minister Junichiro Koizumi took office in the early 2000s — assisted at that time by the Cabinet Secretary Abe Shinzo, who is now the prime minister of Japan for the second time — that those essential policy and institutional reforms were undertaken to revive economic growth, as well as to increase efficiency both in the private and public sectors through further deregulation and competition policies, privatisation of monopolistic government corporations such as Japan Post, modelled after the privatisation of Japan National Railway, and import liberalisation affecting some protected industries.

Realising that Japan’s economic growth would be increasingly dependent upon economic restructuring in high-tech and higher-value industries and consequently a labour force with higher skill and education level, local communities such as the City of Musashino needed to accelerate the transformation of the growth sector in order to survive an increasingly

⁵ White Paper of the Ministry of Health, Labour and Welfare (MHLW) 2011, Statistical Appendix, Table I-3-2.

competitive global market. It is due to the foresight of the municipal leadership of Musashino City, supported by a group of policy advisers, that the City took it in its stride in the right direction to implement economic restructuring much earlier than the GoJ. The City has been successful in undergoing industrial restructuring, maintaining moderate economic growth and employment expansion, and implementing social measures to deal with the ageing population and other local community challenges. The Musashino Approach to urban planning and development (UPD) has bolstered the City's continual effort in transforming into an economically, socially, environmentally and culturally sustainable community. Due to demographic ageing of the labour force, and economic and socio-political globalisation, import and overseas investment constitute an increased proportion in the gross domestic product. This has placed constraints on older workers with fewer employment opportunities and lower income generation on the one hand, and increased demands on social security expenditure on pension, health care and social services on the other. Musashino City, however, has not only been able to thwart the negative impacts on economic growth and fiscal balance at the local level but also accelerated its economic and social restructuring through the concerted efforts of all stakeholders in the community. The Musashino Approach of Transparent and Participatory Governance and Inclusive and Pro-Empowerment Policies, which will be discussed later, has contributed enormously to the successful transition and transformation of Musashino City into an environmentally sustainable and liveable community over the years.

With the new Abe administration in place since December 2012, Musashino City has to deal with another set of serious problems that will become increasingly painful to some segments of the urban population. Having welcomed higher economic growth so far (2.2% in 2012 and forecast for 2013 instead of -0.5% in 2011) through easy monetary policy and fiscal stimulus packages under the so-called "Abenomics", the downward pressure on the Japanese yen's exchange rate vis-à-vis the US dollar and other currencies is already being felt by low-income consumers in terms of higher prices of petroleum, mineral, food crops and agro-industrial products, which are mainly imported from overseas. Simultaneously, small and medium enterprises (SMEs) have been increasingly squeezed between higher prices of imported materials and keen competition in the product market both at home and abroad. Since SMEs constitute the majority of Musashino City's businesses, they will be increasingly under pressure to rationalise their operation and management, resulting in possible lay-offs and, in the worst case, closing-down of businesses. Furthermore, the increase of the consumption tax from 5% to 8% effective beginning in April 2014, together with that of healthcare and nursing care insurance fees for the older generation and the reduction of children's allowances for fiscal 2014 onward, which were announced by the Abe Administration last year, will certainly hit the low-income population all over the country, including those in the City of Musashino.

For this reason, it is important not only to Musashino City but also to all other local communities that the new growth strategy announced by the Abe Administration on 16 June 2013, should be implemented without delay. The new strategy aims to: (a) promote growth and export sectors such as food processing, energy- and environment-related industries, health sector including pharmaceutical, medical equipment manufacturing and health

services as well as tourism through further deregulation, financial and fiscal incentives and administrative measures; (b) provide youth, women and senior citizens with adequate and appropriate employment opportunities; (c) ensure stability and improvement in people's livelihood and living environment; (d) provide the needy with sufficient social protection and security benefits; and (e) ensure high-quality education, health, transportation and other public services for all. The changing national demographic and development policy will continue to pose challenges to the citizens and municipal leadership of the City of Musashino, given the city's high dependency ratio, which will continue to rise in the foreseeable future. In the face of public expectations to maintain the achievements made in the economic, social, environmental and cultural spheres, the mayor must strive to ensure that the impact of changing socio-economic conditions and national policies on Musashino's future sustainable community development (SCD) remains positive.

MUSASHINO APPROACH TO URBAN PLANNING AND DEVELOPMENT (UPD), 1947-2020

(A) A Brief on the City of Musashino⁶

The City of Musashino, one of the subdivisions of the Tokyo Metropolis, covers an area of 10.73 square kilometres with a population of 140,000 (of whom 2,177 are non-Japanese) and 72,967 households as of 1 May 2013. The city is located half an hour's train ride west of Tokyo Central Station. Human settlement in the Musashino area started about 10,000 to 20,000 years ago around a lake called Inokashira. In 1928, Musashino village was renamed as Musashino township, and later the City of Musashino in 1947 when its population reached 63,000. From 1948 onwards, Musashino City initiated a number of unique programmes, such as school lunch preparation centres to cater to the needs of primary schoolchildren, and the weekly municipal garbage collection. Both programmes were the firsts for any municipality in the country, and from 1950s onwards, Musashino City set up its wastewater treatment plants, sports facilities such as swimming pools and stadiums, and other municipal facilities essential for a healthy and comfortable living environment.

Having declared itself in 1960 as a City of World Federation and Peace, Musashino City — which believes and embraces Mahatma Gandhi's teaching and spirit that the greatness of a nation is measured by what it does for the weaker population — initiated a number of social action programmes that promote social and environmental sustainability, particularly targeting at the weaker and vulnerable segments of the population in local community. Beginning in 1963, the City set up more municipal nurseries for preschool children, issued a special certificate of entitlement to the physically and mentally disadvantaged people for their skill training and civic involvement, and was the first in the country to provide monthly

⁶ This section is based mainly on two publications published by Musashino City Office, entitled *Musashino Benricho (Living in Musashino) 2011* and *Musashino-shi Chiiki Seikatsu Kankyo Shihyo (Musashino City District-wise Living Environment Indicators) 2010*.

financial support to children. Also, in 1972, the municipality initiated an environmental education programme for children by integrating experiential learning into primary school mainstream curricula with the cooperation of small farming communities that face the Japan Sea as well as those facing the Pacific Ocean, and proclaimed the Citizen's Green Charter as the basic guide to community living. To encourage citizen participation in the municipal decision-making process, non-governmental organisations (NGOs) and community-based organisations (CBOs) initiated a series of motions in the 1970s at the municipal assembly to establish at least one community centre in each of the 13 residential areas. The community centres, totalling 20 in number now, serve as gathering points for residents to meet and discuss major issues faced in community living, such as health care, education, environment, human rights, child care and elderly care.

In 1981, the City of Musashino declared itself as a City of People's Welfare at the Top Priority, followed by another declaration as a No-Nuclear City, unlike many other cities across the country which welcomed the setting up of nuclear power stations in order to obtain huge subsidies from power companies and the GoJ. In the same year, Musashino established a Nature and Green Education Centre in central Japan, reaching out to primary schoolchildren through experiential nature education. The programme has now been expanded to classes in lower grades so that more children have the opportunities to learn about the bounties of nature and understand how harsh nature impacts on forestation and farming activities. A similar experiential education programme was also initiated in the north-eastern part of the country in 1993. As part of the efforts in environmental education, the City established a Musashino House along the Amur River near Khabarovsk in Siberian Russia and launched student exchange programmes with Chingchong, China and Labok, Texas, as part of experiential education for schoolchildren who wish to participate during school vacation. Also, immediately after the disaster of Great East Japan Earthquake/Tsunami on 11 March 2011, the City of Musashino sent its municipal staff on a long-term basis to assist with the rehabilitation and reconstruction of the disaster-affected sister city, as many other municipalities all over Japan have done. Also, to help people accelerate the rehabilitation of the earthquake/tsunami-affected areas of north-eastern Japan, the Tokyo Metropolitan Government, of which the City of Musashino is one of the subdivisions, had announced, like other cities and prefectures, its readiness to accept some portion of the huge debris amounting to over 30 million tons built up on the seashore in those areas.

(B) Promoting Economic, Social, Environmental and Cultural Sustainability: Core of UPD in the City of Musashino

(i) Sustainable Community Building as the Core Concept

Underlying the City of Musashino's long-term development plans and programmes for over half a century are the maintenance of its economic, social, environmental and cultural sustainability and the strong determination of all successive city mayors to achieve its core UPD

objectives of a “sustainable community”.⁷ The City has been trying to achieve that not only through effective formulation and efficient running of various sectoral programmes under the 10-year development plan, but also through open dialogues with the municipal assembly members elected by citizens and with the large number of CSOs active in the city. These CSOs are actively engaged in promoting their respective causes of social concerns, involving citizens not only in the city but also the neighbouring areas to participate in the activities and maintain direct partnership. The municipal administration of Musashino is not only highly receptive to a variety of citizen’s demands, but also provides subsidies and grant-in-aid to CSOs engaged in fulfilling social causes and improving local public goods. In other words, the Musashino Approach is basically a bottom-up approach whereby “bottom-up actions at the local level generate creative self-reliant solutions, while the top-down supports at the senior government level enables cities to implement local solutions”.⁸

The citizens and the city administration of Musashino firmly believe that unless all of the communities comprising the city are economically prosperous, dynamic and forward-looking, socially just without any discrimination against race, ethnicity, gender, beliefs, religious faiths and other personal attributes, and socially equitable in terms of income and wealth distribution and access to public services such as education, health, sanitation, transportation, recreation and other services, the citizens’ satisfactory livelihood and community well-being cannot be maintained. The following attributes are equally important for Musashino City: environmentally friendly and amenable in terms of clean and good air, water and soil quality; tranquil environment in public spaces and public access to greenery on streets and in parks; cultural preservation of local historical and cultural assets, and community traditions/customs; and promoting citizen’s interests and capabilities in fine arts, performing arts and other artistic values (Table 2).

While there is no doubt that the importance of SCD has come to the fore in the mind of the Japanese public, particularly after the Awaji-Kobe Great Earthquake of 2001 and the Great East Japan Earthquake/Tsunami of 11 March 2011 and the tragic successive explosions of the Tokyo Electric Power’s nuclear power plants in Fukushima on the following day, Musashino citizens and all successive city mayors have long been working towards the goal of SCD as shown in the Third 10-year Development Plan, 1992-2001, which later coincided with the 1992 Earth Summit in Rio de Janeiro, Brazil under the United Nations’ auspices. The third plan had explicitly demonstrated that the long-term development goals are geared towards developing Musashino City as an economically vibrant, socially equitable, environmentally sustainable and culturally inspiring community. As the plan was drafted at a time when Japan was experiencing a bubble economy and subsequently its burst, there were deep reflections on the part of all stakeholders in the city on what went wrong in Japan’s economy and how that had happened as well as recognition of the need for a fundamental

⁷ R. Hirono, *Building an Integrated Series of Sustainable Communities: Lessons from the East Japan Great Earthquake/Tsunami (EJGET) and the Fukushima Nuclear Power Plant Disasters*, UN/Civil Society Forum on Ri0+20, Bonn, 3 September 2011.

⁸ The World Bank, *Eco² Cities: Ecological Cities as Economic Cities*, p. 5.

transformation in community-building that had been oriented heavily towards rapid economic growth in the past. The launch of the third plan also coincided with the fall of the Berlin Wall, followed by the liberation of Central and Eastern Europe and the collapse of the Soviet Union, which unleashed a high expectation in many quarters for the so-called peace dividend and enhanced international cooperation. The third plan was a pioneer in driving the sustainability concept in all four dimensions.

(ii) Long-Range 10-Year Planning Exercise and a High Degree of Interactions between the City Administration and the Public

In order to integrate the four pillars of sustainability, the City of Musashino has placed top policy priority on the Concept and Goals of Sustainable Cities — consisting of a number of innovative programmes and institutional arrangements within the City administration as well as for the municipal's interactions with citizens — in its Long-Range Development Plan 2005-2014 and its Adjusted Plan 2008-2014. It is fair to say that while nearly no differences exist among municipalities in Japan with respect to major urban policy areas such as health care and welfare, children and education, environment and livelihood, urban infrastructure and public administration and finance, vast differences do exist among them in terms of policy priorities as well as the degree of people participation in the process of long-range planning, implementation, monitoring and evaluation. Critical among the major policy priorities in the City of Musashino are those for environmental education and sustainability, waste minimisation and greenery, skill-intensive urban agriculture, high value-added products, interactive information centres, customised commerce and knowledge-intensive business-oriented service sectors, including urban, recreational tourism, and sustainable consumption and lifestyle that encompass food and transportation safety, earthquake/disaster-resilience and crime-free community living.

Reflecting on the post-war period, the first environmental issues facing the City of Musashino were the serious problems of air, water and soil pollution attributed to the national priority on chemical and heavy industrialisation during the 1950s and 1960s. This national strategy had resulted in health risks associated with the increased emission of carbon dioxide (CO₂), oxides of nitrogen (NO_x) and sulphur (SO_x), and discharge of heavy metals, mercury and other chemicals and hazardous materials. The solution to these environmental issues had to come from the GoJ's policy changes and legislative action in the parliament. In the era of governments' preoccupation with rapid economic growth, however, it was impossible to expect major policy changes and enactment on the part of GoJ. Citizens suffering directly from environmental degradation and diseases like the Minamata (mercury), Itai-Itai (heavy metals) and Yokkaichi Zensoku (polluted air) protested in street demonstrations to put continuous political pressures on the government, as happened in the cities of Kumamoto, Kitakyushu, Toyama, Niigata and Yokkaichi during the 1960s and 1970s. Finally yielding to all these street demonstrations and ceaseless pressures by the people and CSOs in collaboration with mass media and opposition political parties, GoJ enacted a series of environmental legislations in the late 60s and early 70s. They were aimed at controlling air, water and soil pollution and installed a regulatory mechanism to implement and monitor the legislative

actions, including the establishment of the Environmental Protection Agency at the central level and its counterpart offices in every prefecture and municipality through legal requirement and enforcement.

The second phase of environmental degradation in the City of Musashino happened towards the end of the 1960s and early 1970s when the prevailing consumption patterns of the rising middle class of major metropolitan cities began to manifest in an increasing amount of garbage littered at street corners and unsolicited dumping sites in suburban wooded areas and river banks. Since the environmental issues of mounting wastes were a result of community living comprising many households as well as local amenities, including neighbourhood stores and shopping centres in most instances, it was the responsibility of local communities to deal these issues directly and in cooperation with the central government. The Stockholm Conference on Human Environment in 1972 and various environmental protection movements in the international community helped municipalities across Japan to handle this sensitive issue with the legislative and financial support of GoJ.

Even from the outset with the First 10-year Development Plan, the City of Musashino had to struggle with the dual problems of mounting household garbage and commercial and industrial wastes. On the one hand, there had been a rapid increase in these two categories of wastes in the process of high economic growth and a changing lifestyle towards “Americanisation”, so to speak. On the other hand, the city administration had to cope with the growing complaints of its next-door neighbours in the City of Mitaka where under the bilateral agreement between the two local governments, the wastes of Musashino households and corporate citizens had been disposed of at the Mitaka incinerator facilities, a typical case of “not in my back yard” (NIMBY). The incident led to serious debate among the citizens and CSOs in the City that reached a consensus that all the Musashino wastes should be disposed of on their own responsibility.⁹ After a series of discussion in an advisory committee set up in the Office of the Mayor as well as among concerned citizens, a new incinerator facility was installed adjacent to the City Office, partly on the ground of NIMBY and more importantly, because of the direct “access” of the facility to all citizens, they are encouraged to reduce, reuse and recycle wastes. In fact, citizen expectations paid off, resulting in the city’s new goal to reduce household wastes down to 600 grammes per day per capita under the Musashino model of garbage separation (burnables, non-burnables, recyclables and hazardous wastes) and fee-based collection by city-designated garbage bags.

Over the years, the City of Musashino has aimed to build a sustainable community where citizens are instilled with a keen sense of community ownership and strong commitment to maintain the city as one of the most economically vibrant, socially equitable and just, environmentally sustainable and culturally rich cities in Japan, as reflected in various

⁹ It is interesting to observe the same issues arising from the installation of an incinerator for bordering cities now being debated by the citizens of the City of Hino, the neighbouring city of the City of Musashino, over the recent agreement concluded between the mayor of Hino and his counterparts in the two bordering cities of Fuchu and Koganei in the suburb of Tokyo.

surveys in Tokyo and nationwide.¹⁰ The keen sense of community ownership, however, did not emerge automatically, but through a series of top-down policy interventions led by the mayor as well as bottom-up approaches by CSOs and other stakeholders active in the city. The concept of sustainable community has gained increased importance not only in Japan but also in the rest of the Asia-Pacific region and around the world. To turn municipalities into “sustainable cities” has gained attractiveness and popularity in many countries, reinforced by appeals made by UN-HABITAT, World Bank, Asian Development Bank (ADB), the United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) and World Chambers Federation (WCF), as seen in the recent Rio+20 Conference held in Rio de Janeiro in June 2012.

The citizens of Musashino strongly believe that their success in the pursuit of economic, social, environmental and cultural sustainability can be attributed to an integrated and balanced policy formulation system that covers the four pillars of sustainable development, and an effective coordination of activities between stakeholders, including CSOs in the City, and the municipality. In order to ensure an integrated effort in pursuit of economic, social, environmental and cultural sustainability, the city administration, in consultation with all relevant CSOs, has installed a number of advisory committees reporting to the mayor over the past few decades. These committees are namely, the Committee on Long-Range Development Plan (CLRDP), which drafts the 10-year development plan with annual implementation plans based on the mayor’s long-term visions laid out in his election campaign platform/manifesto; the Committee on Financial Planning, which drafts municipal financial balances consistent with the long-term development plan; the Committee on Social Welfare, which drafts a detailed plan for comprehensive welfare programmes for residents; and the Committee on Environment, which drafts the municipal plan for environmental protection and conservation programmes.¹¹

The CLRDP, similar to other committees, is mainly composed of deputy mayors (political appointees and top-level administrators), university academics and those “experts” recommended by the Citizens’ Council, whose representatives are relevant CSOs in the City of Musashino. Upon completion of a draft Long-term Development Plan, the Citizens’ Council’s working groups would make their own policy recommendations, based on public opinion surveys, on the types and quality of public services to be provided by the municipal authorities and various existing municipal sectoral plans and programmes. These recommendations are then circulated for further discussion to all political groups in the Municipal Assembly, concerned citizens in community, members of the Citizens’ Council as well as on websites. The redrafted document is then submitted for final adoption by the CLRDP for presentation to the mayor. The Adjustment Plan 2008-2012 was in effect until March 2013,

¹⁰ Conducted annually since 1990, an opinion survey on liveable cities in Japan revealed that all nationwide and local newspapers in Tokyo and its vicinity have found the City of Musashino and in particular its Kichijoji community the most attractive because of its policy priority and achievements in terms of multidimensional sustainability.

¹¹ Discussion on the process of development plans relies mainly on Musashino City Office, *Long-Term Development Plan 2005-2014*, published in 2005 and *Adjustment Plan 2008-12*, in 2008.

and reflected the various changes since the previous LRDP 2005-2014 inaugurated in 2005. In spite of a general agreement among different stakeholders on the Musashino Approach, policy coordination among stakeholders of the four pillars and members within and between Committees has often taken a long time, though achieved at the end, as they represented experiences, viewpoints and, at times, specific interests of different stakeholders sitting onboard.

(iii) Policy Priorities in the New Long Range 10-Year Plan 2012-2021

The Musashino City's Fifth 10-year development plan for 2012-2021 was proposed by the mayor after a long process of serious consultations since the summer of 2010 with the Citizens' Council and all other relevant stakeholder groups, including concerned citizens, CSOs and representatives of the private sector corporations, such as the chamber of commerce and industry, trade union associations, agricultural cooperatives and professional associations active in the city. The CLRDP has formulated core policy plans and programmes designed to improve the living environment of citizens in the city, complete with detailed sectoral plans and programmes for 2012-2021. The policy priorities cover: (a) health and welfare; (b) children and education; (c) culture and living; (d) greenery and environment; (e) urban infrastructure; and (f) public administration and finance. Each of the policy priorities includes at least five to eight programme areas, each of which consists of 10 to 15 main projects to contribute to fulfilling the programme objectives.

Regarding the municipal policy on greenery and environment, special emphasis has been placed on: (a) enhancing environmental awareness in school and community education programmes; (b) encouraging and supporting innovative action plans, programmes and projects for environmental sustainability initiated by all stakeholders, including the private sector; (c) pursuing minimum and zero waste programme with an emphasis on recycling and resource conservation; (d) addressing the challenges of changing social values essential to an eco-friendly lifestyle in the coming decades; (e) rebuilding, reinforcing and expanding infrastructures that are environmentally sustainable and disaster-resilient; (f) enhancing the landscape with greenery and aquaculture in all quarters of the city, e.g., residential, commercial and public; and (g) replacing existing old-fashioned incinerator facilities early with innovative and efficient ones. Also, the draft Fifth Development Plan has made environmental concern a central consideration in formulating and implementing each of the municipal policy priorities, namely health and welfare, children and education, culture and living and urban infrastructure development.

In pursuing these priority policies, programmes and projects under the Fifth Development Plan, the draft of which was finally approved by the Municipal Assembly in March 2013, the CLRDP endorsed the long-held Musashino Approach as crucial to successful plan implementation. The new draft plan stresses the need for the political leadership of the City to encourage the launch of individual and organisational initiatives to meet the current and future challenges faced by the municipal administration in serving all communities of the Musashino City in line with the principle of "government of the people, by the people and for the people". The total municipal expenditure for the first phase of the Fifth Plan between 2012 and 2016 is estimated to amount to 292.5 billion yen, 66.4% of which are to be

financed by municipal tax revenues and cash reserves, and of which 37.6 billion yen will be allocated to investment outlays, another good model for fiscal discipline of all municipalities in Japan (Table 3).

(iv) The Working Relationship between Municipal and Central Governments

It may be too hasty to add, however, that all public services planned and implemented by the Musashino City administration, as with the other local governments, have to be coordinated with the GoJ, which is basically responsible for the essential legal and financing frameworks under which national policies on environment and SCD including the financing are formulated, implemented, monitored and evaluated at the national level. These consultations and coordination efforts by the municipality with the GoJ have often encountered some roadblocks, as the latter had to deal with the diverse interests of the ruling and opposition parties represented in the parliament. Other problems include overlapping responsibilities and lack of policy coordination among different ministries in the cabinet, as well as the City of Musashino's challenging posture towards the GoJ to be innovative and future-oriented in responding to the citizens' changing needs and demands of the four pillars of sustainability.

The GoJ's implementation of the SCD policies, however, has been administered by local governments, which can of course use their discretion to supplement national policies so as to strengthen their service to the public depending on the local communities' specific needs and requirements and also subject to their financial capacity. There are therefore wide differences among local governments in the extent, quality and range of SCD implemented at the local community level. The City of Musashino, together with like-minded cities, has led municipalities in Japan in the last several decades to draw the GoJ's attention to the need of strengthening SCD, in addition to enhancing the social participation of all stakeholders, involving senior citizens in local government decision-making process, community living and activities as well as further decentralisation of policy implementation and budgetary expenditure to local governments.

(C) The Musashino Approach to SCD Formulation and Implementation: Constant Dialogue between Mayors and All Stakeholders and Inclusive and Pro-Empowerment Policies in Favour of the Weaker Segments of the Population

From the discussion above, it is clear that the distinct feature of the Musashino Approach to urban planning for SCD is the Musashino style of municipal governance, i.e., transparent and participatory governance and inclusive and pro-empowerment policies. The former emphasises the maximum level of disclosure of public information and constant dialogue between the mayor and all stakeholders in the city, including CSOs, in formulating, implementing, monitoring and evaluating long-term development plans, municipal policies and programmes. The latter entails the basic tenet of municipal policies that give top priority to the empowerment of the weaker segments of the population such as children, women, the poor including the working poor, the physically and mentally handicapped and the aged

citizens. The Musashino style of municipal governance has over the years reinforced the sense of community ownership and equity among the citizens of Musashino City.

While the successive mayors of Musashino had initiated during the last few decades innovative and inclusive programmes, many of which were for the first time in Japan, and were targeted at all stakeholders including the weaker segments of the population, they could not have accomplished these without the participation of well-organised CSOs, including NGOs and CBOs, as active partners in the specific social concerns of SCD, such as health, education, environment, fine arts, sports, international cooperation, childcare and care for the elderly, among others. Especially in 2012, Musashino Municipality introduced a Basic Plan and Programme for Accelerating CSO Activities in the city, under which the three fundamental principles of “Respect for Voluntarism”, “Innovative Diversity” and “Autonomy or Self-Regulation” were laid down in pursuance of the common goals shared by CSOs and other stakeholders active in the city. As a result, many of these CSOs have been strengthening their collaborative approach with other CSOs within the city in dealing with their respective issues, but have also been working in close association and cooperation with their counterpart organisations elsewhere in Tokyo metropolis and/or at the national level and even at the international level. Registered in the City Office alone, there are now over 100 CSOs in the City of Musashino, actively engaged in various areas of social concern, planning some concrete policy proposals to the mayor of the City and the governor of Tokyo and even to the prime minister of Japan.

On the other hand, over the years, the City has taken an initiative to install a number of community centres for citizens to convene and discuss any issues of common concern to them and to present their own findings directly to the municipal assembly and/or the city mayor. The City Office has also organised a number of seminars and workshops on major issues of common concern to citizens, where well-known scholars and practitioners with specialised expertise are invited to speak. Multi-university seminars are also organised in colleges and universities located within the city so that citizens are able to register either free of charge or at a nominal fee with authorised institutions that take up social causes of their interest. Furthermore, public radio and television stations sponsored by the City in collaboration with citizen volunteers are programming dialogues between the mayor and various CSOs on the major issues of SCD faced by the municipality. In response to a growing demand coming from CSOs within the City, the Municipal City Office has been strengthening its support to all the CSOs actively engaged in involving its citizens in all types of community activities, by providing small office space, equipment and library/information service on civil society activities in Japan and around the world which are to be shared by all CSOs at a newly installed municipal building called Musashino Place.

The Musashino Approach has been a model to many municipal governments throughout Japan in public service delivery. Among the most outstanding programmes are provision of financial assistance to the poor, including the working poor and unmarried women with young children; public housing projects for low-income households; children’s allowance; public nurseries; financial support to registered private nurseries and kindergartens and community centre-based care for preschool children; financial assistance to self-financed university

students from developing countries residing in the city; gender equality in employment, education and other public services; consultation centres for young pregnant women; provision of municipal facilities and programmes for skill-upgrading and for the physically and mentally handicapped seeking employment; and municipal centres that provide a variety of physical education and liberal arts programmes for the elderly in various communities. In this connection, the ambitious “Movus,” later replicated in many other cities across Japan, was launched about a decade ago for the elderly to have easy and low-cost access to activities at community and city centres to assist them in maintaining good health and an active lifestyle by visiting municipal museums, art galleries, theatres, conference centres, or even shopping and outdoor dining. These innovative programmes were initiated because preventive healthcare through active involvement of elderly persons in various sports and recreation programmes has been found to be far more effective and less costly to elderly persons themselves as well as to the municipality partly responsible for financing medical and nursing-care cost, as compared with medical and surgical cost associated with old-age sickness and long-term hospitalisation. “Silver” employment promotion centres, operated by the association of retired persons, provide an employment platform and opportunities — e.g., repair and refurbishment of consumer durables, such as bicycles left unused on the streets, for resale — to keep older generations of Musashino citizens socially active in their post-retirement lives and simultaneously in good health.¹² An amazing point of all these public service programmes offered by the Municipal Authorities in collaboration with citizens of Musashino has been their positive financial contribution to the City’s chest rather than its liability, as they have been provided on the commonly shared principle of “Beneficiaries Pay Principle” (BPP), in addition to that of “Polluters Pay Principle” (PPP). Behind these initiatives of the City of Musashino lie the citizens’ firm belief that as an old saying goes, the rich and the healthy feel neither rich nor healthy and safe in a neighbourhood surrounded by the poor and the sick and that approaches to sustainability governance based on economic values are insufficient — and partly the cause of unsustainable development. There is a clear need to go beyond gross domestic product and market value in measuring development. Human well-being and life quality are important non-anthropocentric values of other living beings and constitute additional values in ecosystem services,¹³ as advocated by the Earth Charter made public in 2001.

¹² Ryokichi Hirono, *Enhancing Long-term Care and Social Participation of Older Persons in East and North-East Asia: Case of Japan and the City of Musashino*, paper presented at a seminar organised by the United Nations Economic and Social Commission, Sub-Regional Office (UNESCAP/SRO) in Incheon, Republic of Korea on 3-4 November 2011.

¹³ International Environmental Governance Architecture Research Group, the Earth System Governance Project, IGES, UNU/IAS and Tokyo Institute of Technology (2011), *Towards a Charter Moment: Hakone Vision on Governance for Sustainability in the 21st Century*, p. 1.

CONCLUSIONS AND POLICY AND INSTITUTIONAL RECOMMENDATIONS FOR SUSTAINABLE URBAN PLANNING FOR SCD IN SMALL AND MEDIUM-SIZED CITIES

The above-mentioned experiences of the City of Musashino in incorporating SCD in the UPD have clearly indicated that in pursuit of the socio-economic well-being of the citizens, the City has long defined and installed the enhancement of economic, social, environmental and cultural sustainability as its core objectives and that the City and its constituent communities have been reasonably successful in fulfilling the objectives through constant review of its long-term development plans and effective monitoring of their plan implementation. Clearly, the Musashino Approach is not only fully supported by its citizens and major stakeholders, but also an exemplary “sustainable community” to the rest of the municipalities in Japan and neighbouring countries in Asia and the Pacific region, as evidenced by the large number of visitors to the City Office every year from municipalities at home and in many countries, developing and developed.

At the same time, the City of Musashino, in trying to fulfil its core SCD objectives through its long-inherited Musashino Approach, has had to adapt its own UPD policies and practices for SCD in response to the changing needs and requirements of the citizens and the dynamic external policy environments and growth scenarios facing Japan. Particularly conspicuous and noteworthy are the serious efforts on the part of the successive City mayors and administration to foresee emerging issues and initiate specific programmes to address them effectively and innovatively in spite of the absence of such programmes elsewhere in the country and, for that matter, in the international community. Musashino City’s risk-taking approach in formulating and implementing SCD policies and programmes is founded on the common values and identities and mutual trust between the mayor and citizens and CSOs, while both sides are perceptive and open to each other’s independent evaluation committees’ criticism on critical municipal policies and programmes. The Musashino Approach to urban planning for SCD has thus helped retain Musashino City’s long-recognised reputation as the most liveable and sustainable city in the country. Under these circumstances, some pertinent lessons and policy recommendations can be drawn and gathered from the experiences of the City of Musashino in terms of urban planning for SCD for the benefit of SMCs in Asia and the Pacific as well as in Europe, whose governments and people are equally concerned with improving their own versions of “eco-city” or “sustainable city”. The lessons and recommendations are:

1. Steady improvement and integrated achievement of the economic, social, environmental and cultural sustainability of the city could form the core objective of urban planning for SCD so that all citizens could benefit from a better quality of life (QoL);
2. Steady economic growth, employment expansion, enhanced social equity, effective protection of the environment and ecological resources and greater cultural diversity as well as improved efficiency and quality of City administration in carrying out its

programmes could be considered as core goals with time-bound quantitative targets under urban planning for SCD;

3. The principle of TAP4E4S4 could form the basis of all urban planning for SCD in promoting better QoL of all citizens;
4. Top policy and fiscal priority could be given to empowering and encouraging the social participation of the weaker segments of the population, thereby contributing to social stability and liveability of municipal community;
5. To improve the cost-effectiveness and quality of development and administrative performance, municipal authority could privatise its operation in every possible public service area and, in so doing, set the standards to be observed by those privatised establishments whose operation could be strictly monitored internally by the municipal office and externally by independent evaluation committees composed of experts and representatives of CSOs. Privatisation must adhere to an effective process of competitive bidding without any discrimination against those enterprises and organisations registered outside the city, as long as they contribute in a measurable manner to improving the efficiency of public service delivery and employment and income of the citizens;
6. The municipal authority with legislative and financial support of the central government should provide a set of enabling environments, including legal, policy and institutional frameworks under which fiscal, financial and administrative incentives are to be provided to private sector corporations for expanding investment, employment and productivity in the city;
7. For citizen participation to be inclusive, efficient and effective, all citizens should have equal opportunities and access to high-quality education, training, health and other public services;
8. Urban planning for SCD should ensure that all policies and measures are well coordinated by the central coordination mechanism in the office of the mayor or his deputies to achieve minimum, or even zero, duplication and less fiscal waste, and reduce confusion among implementing groups on the ground within the City administration;
9. The mayor and his city administrators could delegate to those personnel at the lowest level of organisational structure their authority for the implementation of municipal development programmes and projects, with a view to contributing to human and institutional capacity-building of the City administration;
10. Municipal authority should respond squarely and in a timely manner to any specific needs and requirements of its individual citizens and stakeholder groups irrespective of their personal attributes or political affiliations;

11. The mayor and his administration should be responsible for publishing regularly all their input and output in quantitative and qualitative terms and reports of independent evaluation committees in municipal newsletters and bulletins, in addition to their reports to the city assembly as required by the law;
12. Municipal authority should improve the working conditions, including wages and skill and management training of its staff, particularly the medical-care and nursing-care workers to reduce their physical and psychological burdens associated with the care of disabled and aged persons;
13. The citizens, senior citizens particularly, should be encouraged to undergo regular health examinations at registered clinics and hospitals in the community so that they can stay in good health, and thus reduce medical-care and nursing-care expenditures to be borne both by the national and local systems of health and nursing-care insurance systems;
14. Municipal authority could engage and tap the professional capabilities, expertise and rich experiences of retirees in:
 - a) school programmes as special teachers and volunteers (e.g., teacher assistants, storytellers at nurseries and kindergartens);
 - b) community education programmes as lecturers in seminars and workshops on critical issues affecting municipalities and as volunteers for the care of the sick at city hospitals; and
 - c) productive employment programmes as participants in “silver service centres”, where the elderly repair old household equipments and appliances for resale and supervise bicycle parking lots for “park and ride” commuters and shoppers;
15. Municipal authority could encourage its municipal professional staff to engage in international cooperation in response to requests from developing countries and also in volunteer service programmes in disaster-affected communities;
16. The exchange of useful information on urban planning for SCD in Asia, Europe and other continents could be further encouraged for the mutual benefits of municipalities and their citizens trying to build economically, socially, environmentally and culturally sustainable communities.

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Statistical Appendix

Table 1-1: Demographic Change of Japan, 1950-2050

Years	Number of Persons (million)			Total Number of Population (million)	Working-age	Old age
	0-14	15-64	65 & over			
					% of the Total Population	
1950	29.79	50.17	4.16 (100.0)	84.12 (100.0)	59.6	4.9
1960	28.43	60.47	5.40	94.30	64.1	5.7
1970	25.15	72.12	7.39 (177.6)	104.66	68.9	7.1
1980	27.51	78.83	10.65	116.99	67.3	9.1
1990	22.49	85.90	14.90 (358.2)	123.29	69.5	12.0
2000	18.47	86.22	22.01	126.70	67.9	17.3
2010	16.48	81.29	29.41 (707.0)	127.18 (151.2)	63.9	23.1
2020	13.20	73.64	35.90	122.74	60.0	29.2
2030	11.15	67.40	36.67 (881.5)	115.22	58.5	31.8
2040	9.83	57.34	38.53	105.70	54.2	36.5
2050	8.21	49.30	37.64 (904.8)	95.15 (113.2)	51.8	39.6

Source: Ministry of Health, Labour and Welfare (MHLW), *White Paper on Health, Labour and Welfare 2011*, Table 1-3-2.

Table 1-2: Demographic Change of Musashino City, 2005-2031

Age	2005	2010	2015	2020	2025	2030	2031
0-14	10.4	10.7	10.8	10.3	9.3	8.3	8.2
15-64	70.1	69.3	67.1	66.3	66.2	65.5	65.1
65 & Over	19.5	20.0	22.1	23.4	24.5	26.2	26.7
Total	137,525	134,862	138,802	138,966	138,094	137,515	137,350

Sources: Computed from Musashino City Office, *Municipal Statistics, 2010*, Tables 1-2 and 2-1, pp. 6-7, 18; Musashino City Office, *Musashinoshi no Shourai Jinko Suikei (Population Estimates in Musashino City)*, Figure 2-2-4, p. 8.

Table 1-3: Inter-city Comparison on Age Distribution of Municipal Population, 2012

Age Group	Musashino	Mitaka	Koganei	Nishitokyo	Chofu	Tachikawa	Fuchu	Suginami
15-64	69.7	69.2	69.4	66.9	69.0	67.3	68.1	71.6
65-74	9.8	9.8	9.5	11.0	10.3	11.4	10.0	9.5
75 & over	9.9	8.8	9.0	9.2	8.3	8.4	7.9	9.5
Population growth rates								
2003-2009	2.09	4.67	2.22	5.58	6.20	5.01	6.53	1.26

Source: Musashino City Office, *Musashino City District Living Environment Indicators, 2009*, Table 3-2, pp. 220-221.

Table 2-1: Labour Force (A), Labour Participation Rates (B) and the Rate of Unemployment (C) in Japan, 1970-2010

Year	A (million)	B(%)	C(%)	15-19	20-24	55-59	60-64	65 & over
1970	51.53	65.4	1.1	2.0	2.0	1.3	1.4	0.4
1980	56.50	63.3	2.0	4.1	3.3	2.6	3.6	1.4
1990	63.81	63.3	2.1	6.6	3.7	2.0	3.5	0.8
2000	67.66	52.4	4.7	12.1	8.6	3.9	8.0	2.2
2010	65.90	59.6	5.1	9.8	9.1	4.3	5.7	2.4

Source: MHLW, *White Paper on Labour Economy 2011*, Statistical Appendix, Table 3-1, p. 8 and Statistical Appendix, Table 5, p. 13.

Table 2-2: Labour Force (A), Labour Participation Rates (B) and Daily Commuter Work Force (A+ and A-) and the Rate of Unemployment (C) in Musashino City, 1990-2005

Year	A	B(%)	A+	A-	C(%)
1990	71,988	70.9	49,821	48,982	0.8
1995	70,038	72.0	52,995	47,579	1.2
2000	67,049	69.9	50,775	45,073	1.5
2005	68,631	69.8	49,933	43,049	1.6

Source: Musashino City Office, *Municipal Statistics, 2011*, Tables 2-2-1, 2-3, 2-6 and 2-7, pp. 18-22.

Table 2-3: Distribution of Employment by Sector in Musashino City, 1985-2010

Year	AF&F	M&C.	Mfg.	PU	T&C	W&R	F&I	RE	SVs	PS
1985	0.4	6.4	16.3	0.5	5.1	27.2	6.9	2.5	30.8	3.3
1990	0.4	6.2	15.6	0.5	5.4	24.2	7.4	3.3	32.6	2.9
1995	0.4	5.8	13.2	0.5	5.2	24.3	7.2	3.3	36.0	2.8
2000	0.4	5.1	9.8	0.5	5.5	24.6	6.2	3.6	37.7	2.9
2005*	0.4	4.4	8.9	0.4	12.5	15.9	5.6	4.0	41.5	2.9
2010	0.2	4.2	5.0	0.3	12.7	15.4	5.4	4.6	44.9	2.9

Source: Musashino City Office, *Municipal Statistics, 2011*, Table 2-2-1, p. 22; and Musashino Municipal Statistics, 2012, p. 29.

Notes: * Data classification system is based upon the standard industrial classification system revised in 2002 whereby transport & communications Sector (T&C) includes information technology services (6,233 persons engaged in 2005) that used to be recorded under the service sector (SVs), and the newly classified SVs includes restaurants and tea/coffee shops (3,988 persons employed in 2005) that used to be recorded under the wholesale and retail Sector (W&R).

Table 2-4: Distribution of Employment by Occupation in Musashino City, 1985-2010

Year	A	B	C	D	E	F	G	H	I
1985	19.8	6.8	27.1	18.1	9.0	0.9	0.4	2.2	15.3
1990	20.5	6.8	27.4	17.9	8.6	1.0	9.4	1.9	14.1
1995	20.9	6.5	26.9	18.6	9.3	1.0	0.4	1.9	13.5
2000	23.0	4.6	27.0	18.3	10.3	1.0	0.4	1.8	12.3
2005	22.8	3.6	27.9	16.7	10.4	1.0	0.4	1.6	12.1

Source: Musashino City Office, *Municipal Statistics, 2011*, Table 2-2-2, p. 22.

Notes: A denotes Professional and Technical personnel; B for Managers; C for Clerical; D for Sales; E for Service; F for Security; G for Agriculture, Forestry and Fishery; H for Transport and Communications; and I for Production-floor personnel.

Table 2-5: Distribution of Establishments by Size of Employment in Musashino City, 1986-2011

Year	A	B	C	D	E	F	G	H	I
1986	7,739	62.6	20.9	9.5	2.7	2.3	1.2	0.5	0.3
1996	8,237	57.9	21.8	11.1	3.6	3.1	1.7	0.6	0.2
2006	7,002	56.0	21.4	12.0	4.5	3.5	1.6	0.6	0.3
2009	8,124	55.3	21.3	12.1	5.2	3.3	1.6	0.8	0.2

Source: Musashino City Office, *Municipal Statistics, 2011*, Table 2-1-2, p. 23.

Notes: A denotes the total number of establishments; B for those employing 1-4 persons; C for 5-9; D for 10-19; E for 20-29; F for 30-49; G for 50-99; H for 100-299; and I for 1,000 and over persons. The Enterprise and Establishment Survey taken every five years for decades after the War was replaced by the Economic Census in 2009 onward.

Table 2-6: Income and Local Income Tax Revenue of Musashino City by Taxpayer Group, 2011 (million)

Taxpayer (\ '000)	A	B	C	D	E	F	G	H	I
<\100	1,900	2.7	1,137	0.3	170	1.1	1,088	1.9	0.2
100-1,000	15,635	21.9	21,136	6.5	542	3.7	10,553	18.8	5.4
1,000-2,000	18,967	26.6	44,685	13.7	1,642	11.1	15,001	26.8	13.6
2,000-3,000	11,042	16.7	42,768	13.1	1,746	11.8	10,073	18.0	14.0
3,000-4,000	6,834	9.6	33,156	10.2	1,401	9.5	5,834	10.4	12.7
4,000-5,500	5,860	8.2	37,306	11.5	1,644	11.1	5,106	9.1	12.7
5,500-7,000	3,154	4.4	25,619	7.9	1,179	8.0	2,766	4.9	8.7
7,000-10,000	3,317	4.7	34,479	10.6	1,661	11.3	2,863	5.1	11.6
>10,000	3,731	5.2	85,326	26.2	4,778	32.4	2,775	5.0	22.7
Total	71,350	100.0	325,613	100.0	14,762	100.0	56,059	100.0	257,999

Source: Musashino City Office, *Municipal Statistics, 2011*, Table 14-4-3, pp. 172-173.

Notes: A denotes the number of taxpayers; B for % of total taxpayers; C for total income earned; D for % of the total income earned; E for the total tax paid; F for % of total tax paid; G for the number of the paid employees; H for % of the paid employees; and I for their total income earned.

Table 2-7 Inter-city Comparison on Public Services in the Tokyo Metropolitan Area, 2012

Category	Musashino	Mitaka	Koganei	Nishitokyo	Chofu	Tachikawa	Fuchu	Suginami
School and Community Education expenditure per student/enrolled persons								
Primary	281,978	85.6	61.9	68.4	74.7	61.8	67.6	71.2
Secondary	370,860	85.0	87.7	33.7	41.0	61.2	60.6	75.9
Community	19,096	16.2	56.5	15.1	80.9	97.5	87.8	20.2
Nursing and Health Care Expenditure per patient								
Nursing care	275,278	90.0	7.2	80.0	39.1	80.0	78.8	89.3
Old-age	149,136	14.7	13.7	43.2	34.1	131.3	53.6	64.6
Handicapped	20,414	78.6	64.7	65.2	87.8	99.1	89.4	63.3

Source: Musashino City Office, *Musashino City District Living Environment Indicators 2009, 2010*, Table I-4, p. 219.

Table 2-8 Number of Individuals and Households Receiving Family Assistance in Musashino City, 2001-2010

Category	2001	2003	2004	2005	2006	2007	2008	2009	2010
Individuals	1,219	1,470	1,556	1,579	1,593	1,651	1,793	1,935	2,038
Households	1,001	1,196	1,278	1,301	1,316	1,361	1,480	1,601	1,694

Source: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 1-1, p. 30.

Table 2-9 Urban Land under Greenery Cover in Musashino City, 1972-2010 (%)

	1972	1979	1984	1989	1995	2000	2005	2010
Under green cover	33.3	31.4	29.6	26.3	22.6	24.4	24.0	25.3

Source: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 1-4, p. 53.

Table 2-10 Inter-city Comparison on Parks and Greenery in Metropolitan Tokyo Area, 2012

Category	Musashino	Mitaka	Koganei	Nishitokyo	Chofu	Tachikawa	Fuchu	Suginami
No. of City Parks	105	37	9	42	172	90	237	247
Park Area Per capita (m2)	4.59	3.10	7.07	1.78	6.24	9.46	7.25	1.85

Source: Municipal City Office, Musashino City District Living Environment Indicators 2009, 2010, Table 3-2, pp. 220-221.

Table 2-11 Inter-City Comparison on Low-cost Public Housing, Traffic Accidents, Crimes, Hospitals and Medical Doctors per Capita in the Tokyo Metropolitan Area, 2012

Category	Musashino	Mitaka	Koganei	Nishitokyo	Chofu	Tachikawa	Fuchu	Suginami
No. of Low-cost Public Housing Units	199	129	179	52	267	481	651	1,058
As % of Total No. of Households	0.3	0.1	0.3	0.1	0.3	0.6	0.6	9.4
No. of Traffic Accidents involving Injury	620	629	421	811	887	1,049	1,069	2,428
No. of Crimes as % of Total Population	2.44	1.11	3.53	1.45	3.02	2.35	1.22	1.32
No. of Hospitals	10	9	4	5	8	7	13	18
No. of Persons per Medical Doctor	329	225	824	852	784	375	410	627
No. of Persons per Dentist	762	1,578	1,835	1,412	1,161	1,142	1,362	949

Source: Musashino City Office, Musashino City District Living Environment Indicators 2009, 2010, Table 3-2, pp. 224-225.

Table 2-12 Household, Commercial and Industrial Wastes and Water Consumption in Musashino City, 2002-2011

Category	2002	2004	2006	2007	2008	2009	2010	2011
Waste generation								
Per Day, gram	1,113	1,050	1,001	975	946	890	885	872
Per Year, kg	406	383	365	357	345	325	323	319
Total, MT	54,627	51,568	49,888	48,811	47,286	44,708	44,670	44,122
Water Consumption								
Per capita per day, litre	364	361	356	354	348	345	342	334
Total, 1000m3	17,795	17,748	17,721	17,733	17,400	17,297	17,282	16,890

Source: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 2-1, p. 42 and Table 1-6, p. 54.

Table 2-13 Waste Treatment and Disposal Expenditures in Musashino City, 2002-2011 (\ million)

Expenditure Item	2002	2004	2006	2007	2008	2009	2010	2011
Collection/transport	1,492	1,686	1,654	1,645	1,687	1,544	1,498	1,423
Midpoint treatment	1,475	1,136	1,147	1,219	1,334	1,525	1,349	1,517
Terminal disposal	369	447	428	397	398	402	408	405
3R	101	90	86	91	87	100	107	85
Total	3,437	3,359	3,315	3,352	3,506	3,571	3,362	3,430

Source: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 2-3, p. 42.

Table 2-14 Air Pollution in Musashino City, 2002-2011 (ppm: parts per million)

Types	2002	2004	2006	2007	2008	2009	2010	2011
NO ₂	0.027	0.027	0.024	0.021	0.019	0.020	0.018	0.017
NO	0.017	0.016	0.013	0.013	0.008	0.006	0.004	0.005
SO ₂	0.005	0.004	0.001	0.001	0.001	0.001	0.001	0.001

Source: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 3-2, p. 43.

Table 2-15 Number of Citizen Complaints on Pollution in Musashino City, 2002-2011

Types	2002	2004	2006	2007	2008	2009	2010	2011
Air pollution	24	29	18	40	15	22	15	6
Noise	67	81	39	79	95	80	41	24
Vibration	13	25	22	16	6	13	10	8
Odor	24	27	18	25	11	18	10	5
Others	34	79	123	108	118	117	172	126

Source: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 3-1, p. 43.

Table 3-1 Fiscal Balance of Musashino City, 2006-2010 (\ million)

Year	A		B		C		D		E	
	R	E	R	E	R	E	R	E	R	E
2006	58,974	56,158	2,687	2,676	10,073	10,006	9,395	9,383	7,722	7,462
2008	59,200	54,051	2,580	2,560	11,126	11,061	3,363	3,237	8,144	7,902
2010	61,818	59,134	3,480	3,459	10,912	10,867	2,723	2,714	8,866	8,735

Source: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 14-3-3, p. 157.

Notes: A denotes the general account; B for the sewerage account; C for the national health insurance account; D for the old-age medi-care account; and E for the old-age nursing-care account.

Table 3-2 Annual Revenues of Musashino City, 2006-2010 (\ million, %)

Revenue items	2006	2008	2010	Revenue items	2006	2008	2010
Total	88,974	59,156	61,779	User charges & fees	3.0	3.0	2.9
Local Income Taxes	64.7	61.2	59.1	National transfer	7.1	11.6	9.8
Local inheritance tax	1.2	0.4	0.3	Const. subsidy	1.4	2.3	0.6
Interest revenue tax	0.5	0.5	0.4	Metropolitan transfer	5.8	6.0	7.0
Dividend revenue tax	0.3	0.2	0.1	Const. subsidy	1.9	0.9	0.8
Stocks & gift taxes	0.2	0.1	0.0	Asset earnings	0.3	0.4	1.4
Local consump. tax	3.1	2.9	3.0	Contributions	0.0	0.0	0.0
Auto purchase tax	0.5	0.4	0.2	Carryover	4.9	5.0	5.3
Special transfer	2.5	0.6	0.3	Miscellaneous	1.0	0.9	1.0
Revenue sharing	0.1	0.0	0.0	Operating income	0.1	0.0	0.0
Traffic safety tax	0.0	0.0	0.0	Municipal bond	1.7	1.9	4.4
Local assignment	0.3	0.2	0.2	Fund revenue	2.8	4.5	4.6

Source: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 14-3-4, pp. 158-159.

Table 3-3 Inter-city Comparison of Per Capita Local Tax Revenue in Tokyo Metropolitan Area, 2010 and 2012

Cities	Total tax revenue	Individual income tax	Corporate income tax	Property tax	Other tax
Musashino	271,723 (263,022)	112,342 (117,844)	19,443	110,563	29,376
Tachikawa	211,389 (216,626)	68,545 (75,740)	28,299	91,356	23,188
Chofu	197,104 (198,239)	84,479 (93,050)	19,335	72,902	20,389
Fuchu	194,790 (199,587)	75,870 (81,493)	12,448	87,600	18,872
Kunitachi	193,581	89,765	8,192	73,611	22,913
Mitaka	193,068 (201,431)	90,943 (98,947)	7,617	73,400	21,108
Tama	191,426	72,826	13,164	86,226	19,210
Kokubunji	186,790	88,170	6,827	68,237	23,558
Hamura	182,029	59,806	8,631	90,396	23,196
Koganei	176,165 (176,737)	88,995 (94,824)	5,576	61,883	19,711
Akishima	167,550	60,732	8,896	77,293	20,629
Inagi	167,416	73,706	5,601	68,888	19,221

Sources: Musashino City Office, Musashino City through Statistical Eyes, 2012, Table 14-4-2, pp. 168-171; and Table 3-2, pp. 270-271.

Note: Figures in brackets are for 2012.

Table 3-4 Inter-city Comparisons of Fiscal Resilience in Tokyo Metropolitan Area, 2009 & 2010 (\ Million)

Municipalities	Revenue (A)		Expenditures (B)		Per capita B		Fiscal resilience (C)	
	2009	2010	2009	2010	2009	2010	2009	2010
Musashino	60,539	61,778	57,261	59,094	423,950	434,509	1.605	1.547
Chofu	80,178	79,760	76,150	76,700	350,791	352,134	1.351	1.309
Fuchu	88,663	93,497	85,566	90,564	348,625	367,129	1.341	1.280
Mitaka	63,233	64,071	61,863	62,513	349,866	354,258	1.257	1.205
Tachikawa	75,812	69,129	72,950	66,403	418,421	379,632	1.246	1.196
Tama	49,545	51,028	47,680	49,509	327,488	341,668	1.237	1.191
Koganei	38,812	39,199	37,232	38,023	332,960	335,666	1.158	1.120
Machida	131,220	136,195	126,628	132,713	302,995	316,214	1.153	1.097
Hamura	20,999	20,710	20,355	20,216	362,982	360,822	1.121	1.055
Hachioji	195,780	193,509	192,113	193,665	348,526	349,709	1.032	1.000
Fussa	21,713	21,940	21,453	21,554	369,734	374,903	0.792	0.765
Kiyose	27,703	27,655	26,913	26,994	370,024	370,145	0.732	0.707

Sources: Musashino City Office, Municipal Statistics 2010, Table 14-3-5, p. 162.
Musashino City Office, Municipal Statistics 2011, Table 14-3-5, p. 162.

Note: (C) is calculated by dividing standard fiscal revenue by standard fiscal demand expenditures, using the average for the three years including the current fiscal year.

The Construction of Eco-cities in China: The Case Study of Sino-Singapore Tianjin Eco-city

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An eco-city is a kind of urban development pattern which is based on ecological principles and the theory of sustainability, and synthetically constrained by the natural environment in an area where a city locates. It is an open and complex artificial ecosystem, promoting a clean environment, sustainable economic development, public health and wealth, and social harmony and progress.

BACKGROUND TO SINO-SINGAPORE TIANJIN ECO-CITY

Sino-Singapore Tianjin Eco-city is one of the most important collaborative projects between China and Singapore, and the first eco-city constructed under an agreement between nations in the world. In April 2007, when former Premier Wen Jiabao met Singapore's Senior Minister Goh Chok Tong, they proposed cooperation in the building of a resource-saving and environment-friendly city that promotes social harmony in China. In July 2007, then Vice Premier Wu Yi visited Singapore and jointly established the "four requirements" and "two principles"² to select the location of an eco-city with Singapore Prime Minister Lee Hsien Loong.

On 18 November 2007, Wen and Lee signed The Framework Agreement to Build an Eco-city in the People's Republic of China between the Government of the People's Republic

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² The "four requirements" of the Sino-Singapore Tianjin Eco-city construction are: first, highlight resource-saving and environment-friendly principles; second, comply with relevant Chinese laws and regulations, and requirements of national policies; third, enhance the capability of independent innovation; and fourth, insist on the principle of separating government administration from enterprise management. Meanwhile, the "two principles" of the site selection of the eco-city are: first, reflect the demonstration significance (as a fine example of constructing the eco-city for other eco-cities) of constructing the eco-city under resource constraints, especially in mainly non-arable land and water-scarce areas; second, close to a city centre to tap on the big city's traffic and service advantages, and to save infrastructure construction costs.

of China and the Government of the Republic of Singapore, and the Ministry of Housing and Urban-Rural Development of China and the Ministry of National Development of Singapore signed The Supplementary Agreement to the Framework Agreement to Build an Eco-city in the People's Republic of China between the Government of the People's Republic of China and the Government of the Republic of Singapore. These agreements marked the birth of the Sino-Singapore Eco-city.³

RECENT DEVELOPMENT OF SINO-SINGAPORE ECO-CITY

The Planning of Sino-Singapore Eco-city

Scientific Planning Ideas

While the planning of Sino-Singapore Eco-city mainly reflects the basic philosophy of “4321”,⁴ the overall planning adheres to principles of resource utilization, ecological environment and sustainable development, which mainly include ecological economic, ecological social, ecological environmental and ecological cultural aspects. The planning ideas highlight features such as ecological priority, people-oriented, emerging industries, and green transportation infrastructure, thus shaping the spatial layout, which can be described as “one axle, three centres, four areas, one island, three waters and six galleries”⁵. According to preliminary estimates, the construction will be completed within 10 to 15 years and the Eco-city will house a population of about 350,000.⁶

Detailed Evaluation Index System

The Sino-Singapore Tianjin Eco-city Evaluation Index System includes 22 controlling indices and four indicating indices, which quantitatively interprets eco-cities around the world. The index system is categorised into subject, stage, space and link, presenting an implementation plan of 51 core elements, 129 key links, 275 controlling objectives, 723 specific controlling measures and 100 statistical methods, which meet or even exceed the standards of advanced

³ Research Group on Sino-Singapore Tianjin Eco-city Index System, “Navigation of Ecological Cities—Implementation Mode of Sino-Singapore Tianjin Eco-city Index System”, *Beijing: China Building Industry Press*, 2010, p. 67.

⁴ *Four areas* are: ecological environment, ecological economy, ecological technology and ecological culture; *three harmonies* are: relationships between human and human, between people and economic activities, and between people and the environment; *two aspects* are: realization of mutual connection and complementation of urbanization and industrialisation; *one road* refers to the road to sustainable economic and social development.

⁵ *One axle* denotes the ecological valley; *three centres* refers to one city centre and two city sub centres; *four areas* covers four integrated areas; *one island* refers to the green core of ecological water systems; *three waters* encompasses the reservoir, Ji Canal and the old course way of Ji Canal; *six galleries* includes six ecological corridors built with an ecological island as the core.

⁶ Sino-Singapore Tianjin Eco-City Administrative Committee, “Brief Introduction on Sino-Singapore Tianjin Eco-City”.

countries. Based on this index system, the Eco-city will establish a plant community based mainly on locally fitted plants and restore natural water systems, wetlands and vegetation, where the green coverage rate may reach 50% and the per capita green area may exceed 12 square metres.

In addition, the Eco-city will adopt a multi-levelled water provision system and build a dedicated drinking water system. The rate of reclaimed water reuse, rain water collection and sea water desalination are expected to exceed 50%. With the active use of geothermal, solar, wind and other renewable energy, the clean energy utilization rate is expected to hit 100%, while renewable energy utilization rate will reach 20% and the amount of carbon emissions per million dollar gross domestic product (GDP) will be lower than 150 tons. With separate collection of waste, and integrated treatment and recycling of waste, realizing harmless treatment rate of house refuse has reached 100%, while the recycling rate of garbage is reaching 60%. With the development of a green transportation system which will include rail transportation, clean-energy buses, and a slow traffic system, the proportion of green commuting rate is estimated to hit 90%, which is close to or may even exceed the world's advanced level.⁷

Green Development Feature

The planning of Sino-Singapore Tianjin Eco-city reflects “green developing” ideas in all aspects, such as avoiding occupation of arable land by the eco-city; strengthening ecological restoration and protection; implementing green architecture standard system; building green traffic network system and green energy supply system; establishing a low-carbon industrial system; and constructing harmonious liveable communities.

Concerning Public Opinions

The planning program of Sino-Singapore Tianjin Eco-city⁸ has been publicised to invite views from the public. On 6 May 2008, the community management committee (CMC) of Sino-Singapore Tianjin Eco-City held a press conference to announce the overall planning of the Eco-city, including short-term and long-term planning considerations such as site selection of the Eco-city, development goals, orientation of the city, economic functions, ecological protection and ecological restoration, and spatial layout structure. The Sino-Singapore Tianjin Eco-City went further to organise an exhibition, launched the Eco-City Government Portal (<http://www.eco-city.gov.cn>) and established a hotline to connect with the public. The overall planning was further adjusted and improved, taking into consideration comments and suggestions received.⁹

⁷ Sino-Singapore Tianjin Eco-City Administrative Committee, “Index System of Sino-Singapore Tianjin Eco-City”.

⁸ Sino-Singapore Tianjin Eco-city's overall planning is designed by the China Academy of Urban Planning and Design, Tianjin Institute of Urban Planning and Design and the Urban Renewal Authority of Singapore. The plans were formulated after a comprehensive summary of the planning program, and adopted after expert argumentation and Tianjin Planning Committee's examination.

⁹ “Publicity of Sino-Singapore Tianjin Eco-city Overall Planning”, *Tianjin Construction Science and Technology*, 2008 (2), p. 11.

Sino-Singapore Tianjin Eco-city Construction

Achievements of Harnessing Ecological Environment To-date

To-date, the Eco-city environment comprehensive harnessing work has seen some results. Since the start of construction, the only large water in the region, a three-square-kilometre sewage reservoir, has turned into a “clean lake”, a significant step towards protecting the environment. The sewage disposal work has realised the goal of a circular use of resources as a whole.¹⁰ The survey by the CMC indicates that the completed construction of 100,000 tons of sewage treatment plants and treatment of urban sewage library completed in October 2011 has elevated Sino-Singapore Eco-city’s technology for disposal of sewage and heavy metal-contaminated sludge to international first-class level.

The Eco-city has also completed a comprehensive renovation of two kilometres of the demonstration segment of the old waterway and harnessed large-scale saline land, which extended greening space to three million square metres.

Eco-city Facility Construction

Infrastructure Construction

For the intelligent traffic network, the Eco-city synthetically uses a variety of ecological technologies to reform the design of the road, such as the use of new water permeable bricks to collect rain water; the use of solar energy and other renewable energy for all street lights; and ensuring that all pipe networks are centrally deployed to ensure zero manholes on vehicle lanes. The Eco-city has also spared no effort in promoting ecological road construction at the initial area and within 24 kilometres of its surrounding. So far, 10 kilometres of the infrastructure have been completed and road lengths have reached 52 kilometres, or half of the region-wide total road network. The total cumulative construction area of public buildings, industrial and residential projects is nearly 5,000,000 square metres. Many projects which fully implement green architecture standards have won green architecture awards at home and abroad.

In September 2011, the Sino-Singapore Tianjin Eco-city’s smart grid model project, with one of the most extensive coverage areas and most complete functions in the world, was completed and put into operation. The project can lead to the fusion of Cable TV, IP telephone and the Internet.

Private Residential Buildings and Public Housing Construction

The construction of private residential buildings within the Eco-city started on a good footing and the number of commercial housing built could have surpassed the 10,000 mark.

The construction of public housing took the same step-by-step approach. In the first phase, a total of 592 units of public housing were delivered and more than 30 households,

¹⁰ “Sino-Singapore Tianjin Eco-City: Rapid Project Construction, Big Change of Region Image”, 26 July 2010, <<http://news.dichan.sina.com.cn/2010/07/26/190045>, (last accessed 20 November 2012).

comprising mostly enterprise staff in the Eco-city, have moved in. Though each unit is only about 60 m², it is well designed to accommodate a kitchen, toilets and other uniform utility room.¹¹

Energy and Waste Management

Comprehensive Utilisation of Renewable Energies

The first national renewable energy demonstration was built in Sino-Singapore Tianjin Eco-city. Solar power generation capacity and wind power installed capacity have reached 12.3 MW and 4.5 MW respectively. The building area with ground source heat pump is 690,000 m² and the residential area utilising solar-heated water is 1.5 million square metres. The biggest smart grid demonstration project in China has also been completed and put into use. National 2 anime park energy station has comprehensively and intensively utilised a variety of energies, with the utilisation rate of renewable energy possibly reaching the city's long-term goal in 2020.¹² The utilisation ratio of wind power, solar power and other renewable energy, especially ground source heat pump technology, will reach 20% or more soon and is taking the lead in the domestic scene. In the same vein, wind and solar power generation technology has been used for the road lighting system on both sides of the street.

New Waste Management and Recycling Mode

By encouraging green consumption patterns and lifestyles to achieve waste reduction, the amount of waste generated per capita is kept at 0.8 kg/person per day. The garbage is separately collected to achieve harmless disposal and recycling utilization. The southern area of the Eco-city applies a pneumatic conveying system to transport garbage; this closed transport environment helps reduce garbage's secondary pollution to the environment and the workload of the sanitation workers, consequently, enhancing the overall quality of the environment.¹³

The Eco-city utilises 10 mini-sanitation vehicles to clear snow and clean the streets. Also in the pipelines are solar dustbins that can be used to break down rubbish. Tianjin Eco-city creates a new model of "classified garbage placing by households, separate collection in residential communities, unified transportation by classification and separate processing in nearby district".¹⁴

According to a brief introduction by an Eco-city staff, roofs, pavements, parking lots, squares and other open spaces in the city are designed with a rainwater collection system,

¹¹ Author's field research data of Eco-city CMC.

¹² "Sino-Singapore Tianjin Eco-City Build Four-level Social Service System including Ecological city, Ecological Area etc", 9 November 2012, <<http://www.022net.com/2012/11-9/432867193257537.html>> (last accessed 1 December 2012).

¹³ Research Group on Sino-Singapore Tianjin Eco-city Index System, "Navigation of Ecological Cities—Implementation Mode of Sino-Singapore Tianjin Eco-city Index System", *Beijing: China Building Industry Press*, 2010, p. 496.

¹⁴ Liu Changhai, "Sino-Singapore Tianjin Eco-City Uses New Type of Solid Waste Process Equipment", 7 January 2012, <http://www.tianjinwe.com/tianjin/bh/mlbh/201301/t20130104_194941.html> (last accessed 14 January 2013).

which can lead rainwater to cisterns to supplement landscape water and to be used as green clean water. Domestic waste-water and industrial waste-water are channelled to and centrally processed in the sewage treatment plant through a pipe to produce reclaimed water for the toilet flushing system, for cleaning pavements and so forth. Reclaimed water from sewage treatment plants and desalination technology will constitute more than 50% of the water supply.

Investment and Financing – A Diversified Investment Mechanism

Investment and Financing

In accordance with the principle of “no give, no take, and self-development”, the Tianjin municipal government returns local taxes to the central government. The CMC of the Eco-city has established a special financial fund for environment protection and construction investment. Utilising the policy advantages of the comprehensive reform pilot project of the Binhai New Area, the Eco-city establishes an investment and financing system for eco-industrial development and actively supports enterprises by issuing bonds and public financing. Through applying for national ecological special funds and broadening the areas of foreign capital utilization, the city explores the implementation of emissions trading, establishes regional environmental compensation mechanisms, encourages investors to participate in the construction of the Eco-city project and further expands the ecological construction funding sources.

Construction Investment

At the time of writing this paper, the total area of projects under construction in the Eco-city was 4.87 million square metres and actual investment was 48.5 billion yuan. With construction of the Singapore Food Palace project, the Eco-city joint venture company and five Singapore enterprises signed an investment agreement worth nearly 6.8 billion yuan. A number of major projects in the field of energy saving and environmental protection, modern logistics, biomedicine, marine science and technology have made great headway.¹⁵

Bank Capital

The Eco-city is further supported by a Global Environment Facility (GEF) grant of \$6,160,000 to China by the executive board of the World Bank for building an energy-saving

¹⁵ “Investment of Sino-Singapore Tianjin Eco-City Construction Project is 48.5 Billion Yuan”, 24 September 2012, <<http://biz.xinmin.cn/2012/09/24/16465719.html>> (last accessed 1 December 2012).

and environment-friendly city.¹⁶ The first loan of 220 million yuan in fixed assets from Tianjin Branch of Huaxia Bank was for the construction of the main buildings in the city.¹⁷

Singapore's Ongoing Investment

In 2012, the Sino-Singapore Tianjin Eco-city Investment and Development Co (SSTEC) signed an investment agreement of 6.8 billion yuan with five Singapore companies. Singapore International Enterprise has also agreed to provide S\$9.5 million (about 48 million yuan) in the next five years to promote and encourage Singapore companies to set up overseas business bases in the northern China market with Sino-Singapore Tianjin Eco-city as a platform.¹⁸

Management of the Eco-city

Urban Management and Operation Mechanism

The Eco-city has a rather unique management and operation system. It has a three-level management system with the highest level helmed by deputy prime ministerial-level personnel; the second level is the “Sino-Singapore joint working committee” at the ministerial level. The third level is the CMC, set up to exercise related administrative functions on behalf of the municipal government. Singapore’s Ministry of National Development also set up an office in Tianjin Eco-city.¹⁹ China established the Eco-city Investment Company to oversee land consolidation, construction of ecological environment and public facility welfare and joint ventures with Singapore enterprises. The Eco-city Investment Company and the joint venture company are responsible for the relevant municipal infrastructure respectively. The joint venture company is responsible for commercialized projects, industrial construction and investment promotion. In most of the Eco-city projects, government participation is minimal as most of the work is done by the market. Private enterprises play a leading role while the government plays a secondary role by providing favourable conditions to ensure the success of the project.

Community Management

The Sino-Singapore Eco-city taps on Singapore’s experience in constructing a “neighbourhood unit” based on a three-level ecological community mode of ecological cells, ecological communities and ecological areas. The ecological areas set up a “neighbourhood centre” or zoning

¹⁶ Zhao Lei, “Sino-Singapore Tianjin Eco-City Uses the GEF Grant for Energy Saving and Emission Reduction Construction,” 30 August 2012, <<http://news.dichan.sina.com.cn/2010/08/30/206149.html>> (last accessed 1 December 2012).

¹⁷ “Tianjin Branch of Huaxia Bank Injects the First Batch of 220 Million Yuan to Support the Construction of Sino-Singapore Tianjin Eco-city”, 14 March 2012, <<http://finance.qq.com/a/20120314/007142.htm>> (last accessed 1 December 2012).

¹⁸ Liu Changhai, “Singapore Invests 9.5 Million Singapore Dollars in Five years to Help Companies to Settle in Tianjin Eco-City”, 9 March 2012, <<http://tj.focus.cn/news/2012-03-09/1830776.html>> (last accessed 15 November 2012).

¹⁹ Author’s field research data of the Eco-city CMC.

commission that is similar to the general street office in a Chinese city. Neighbourhood committees come under the neighbourhood centre. The Zoning Services Department director is responsible for the day-to-day operation of the “neighbourhood centre”. He is assisted by social workers recruited by the Zoning Commission. Social worker positions are open to the public and should have a bachelor’s degree at least. The newly appointed have to undertake a three-month training regime in Singapore before they can officially start work at the neighbourhood centre. The first batch of social workers have already undergone training overseas.

The Eco-city has recently launched two hotlines, one for emergency and the other for medical services.²⁰ It has also started its online community (www.tjeco.org) to further strengthen ties between residents, optimise community services and improve community vitality and cohesion.²¹

Eco-city Industrial Development

Sino-Singapore Eco-city has constructed many parks, such as the National Animation Park, National Television Park, Technology Park and Industrial Park, to speed up the introduction of four leading industries: culture and creativity, environmental technology, financing and commerce, and green architecture. In July 2012, the total number of registered enterprises was more than 800, with total registered capital of 600 million yuan; the tax of 23 enterprises alone amounted to 10 million yuan.²² In the Eco-city’s animation industrial park are 856 enterprises with a total registered capital of 64.4 billion yuan. Huayi Brothers and Shanda Literature Enterprise are key players in the Eco-city and cultural and creative industries have taken shape. In December 2012, there were nearly 70 people and 14 animation studios settled in the animation industrial park. Public technical service platform with high-end animation film and television production technology is the most needed technical platform for many enterprises.²³ The Eco-city thus selects enterprises based on group, base, chain and modern services, and creates a high-end, high-quality, high-tech modern urban industrial system. This is to avoid utilising resources, lessen energy consumption and to get rid of pollution in order to build a high-end, high-quality, high-tech and modern urban industrial system.

The Eco-city has also enacted regulations, such as Sino-Singapore Tianjin Eco-city Preferential Policy Advices on the Introduction of Talents (30 November 2012), Sino-Singapore Tianjin Eco-city Interim Provisions on Talent Introduction, Training and Rewarding (30 November 2012), Sino-Singapore Tianjin Eco-city Promotion Measures on

²⁰ Drawing its lessons from the Tianjin Eco-City, the city has launched two hotlines for emergency and medical services. The emergency hotline is 66328893 and 66328957 and the medical service hotline is 66328039 and 66328919.

²¹ Ibid.

²² “The First Five Months Eco-City Attracted 122 New Enterprises, Completes 61% of Yearly Investment Promotion Task”, 5 July 2012, <<http://www.eco-city.gov.cn/eco/html/qyzq/tzdt/20120705/7583.html>> (last accessed 1 December 2012).

²³ “856 Companies Settle in the Sino-Singapore Tianjin Eco-city Animation Park”, 20 December 2012, <<http://news.163.com/12/1220/15/8J66ELQO00014JB6.html>> (last accessed 5 January 2013).

the Development of the Animation Industry (28 October 2009) etc., to attract talents and to promote enterprise development.

PROBLEMS FACED

Macro Level

At the macro level, the Eco-city adopts a “top-down” mode of decision making, which inhibits “bottom-up” impetuses. The supporting policies for the construction and development of Sino-Singapore Tianjin Eco-city are issued at the national level by the central ministries and commissions. For instance, the National Development and Reform Commission has launched a green channel for Sino-Singapore Tianjin Eco-city’s application to issue 1.2 billion yuan of corporate bonds by approving it immediately. The intelligent power generation in the Eco-city could be used not only within the city, but also by State Grid Corporation of China at market price. The Ministry of Housing and Urban-Rural Development rewards Sino-Singapore Tianjin Eco-city with 50 million yuan for achieving 100% of green architecture in the city. In contrast, although the Tianjin municipal government and the Binhai New Area also support the Eco-city’s policy, it is merely in form as they seldom administratively regulate or intervene in the operation of the Eco-city.

With the local government’s “hands off” approach as well as tremendous support at the national level, given that the Eco-city is an inter-governmental cooperation, the Eco-city has developed rapidly using its initial investment in the early days; however, the pace of development seems to have lost its steam as infrastructure and public facilities construction slowed. While the fact that the Tianjin municipal government and the district government have no access to the Eco-city’s fiscal revenue and no administrative powers over the Eco-city would mean that the city is given a free hand in its administration, it also means that the local governments would not provide a lot of policy and financial support. The construction progress for public facilities in particular was rapid at the initial stage when national investments were sufficient and trailed off as the capital ran out. On the other hand, the real estate sector continues unabated as private investment kept up its flow. This development led to asynchronous construction of private housing, public housing and public facilities. In addition, as the original intention was to construct a large transnational project, social or private capital was not considered at the outset. This was in contrast to eco-city construction processes in other countries where great importance has been attached to attracting private capital and raising special funds. In ecological city construction, the financial input largely determines the success of capital operations. Therefore, it is crucial that the construction of ecological cities be based on a diversified investment system. While rationally using and increasing government investment, it should actively attract funds from society to, ultimately, gain strong public support and participation.²⁴ Lastly, due to the “top-down” decision-making mode, the participation of the public and enterprises in the planning and construction of the Eco-city

²⁴ Ju Meiting, Wang Yong, Meng Weiqing and Ho Ying, “Theory and Practice of Eco-city Construction”, *Beijing: Chemical Industry Press*, 2007, p. 218.

is minimal; this also leads to their lack of a clear understanding of the future development of the Eco-city and the broad response and support from the public.

Micro Level

Eco-city Planning Internal Index

A large number of technologies, such as photovoltaic technology, wind energy technology, waste disposal technology and so on, have been used in the buildings of the Sino-Singapore Tianjin Eco-city. Whether they fit into a complete urban system is still questionable. While the use of state-of-the-art technology may be good, it is not a simple one-plus-one-equals-two equation. Ecological technologies should be adapted to local conditions and each technology should not be independent of other technologies, and need to form a perfect system. Eco-city construction is a comprehensive effort involving not only environmental construction but building standards and transportation systems. The city's overall scientific planning and focus on the association between every link would have to be looked into. In addition, a comprehensive index evaluation system is also needed. The Eco-city has designed initial indices, but it has yet to run tests or to solicit feedback after the implementation of the entire index system.

Lack of Systematic Green Education Contents and Cultivation of Public Ecological Awareness

The ecological education of residents in the Eco-city comes under the purview of the bureau of social affairs in the CMC. The bureau has developed The Convention of Eco-city residents, which provides residents with guidelines on ecology and environmental protection. The Eco-city has also developed The Household Garbage Management Approach, which is mainly related to the waste classification scheme and to guide people on garbage classification, so as to cultivate environmental awareness in a specific way. Lastly, a clean and neat ecological environment also has a positive influence on people's ecological consciousness and behaviour. An example could be seen in the enterprise which decorates its indoor space with greening work.

Tianjin Environmental Education Ordinance, which was enforced in 2013, involves environmental knowledge-learning hours for communities, enterprises and schools. Yet effectively cultivating citizens' ecological awareness by scientific systems and making residents' behaviour more in line with the requirements of green and low-carbon, environmental and ecological protection are inadequate for the city. The lack of a complete set of green education system is detrimental to the long-term development of the Eco-city.

Lack of Specific and Effective Public Participation Contents

The planning of the Eco-city did not expressly address the problem of public participation. It was only during the construction planning of the Eco-city that public opinions were extensively solicited; public participation in the construction of the Eco-city is very limited. This is

in consideration that the construction of the city is still in its initial phase and the number of enterprises and residents currently housed within the city is relatively small.

Problems Faced During Construction

Slow Living Facility Construction

Investigations have shown that many registered companies have yet to settle in the Eco-city as the living facilities are still inadequate. Visits to some enterprises, such as Tianjin Haochuan Culture Communication, China Diffuse Brothers Tianjin Interactive Entertainment, Tianjin Binhai New Area Green Tree Animation Technology and other companies, show that while there were high praises for the various preferential policies and ecological construction of the Eco-city, the problems of imperfect living facilities and transportation are serious. A company official said that the lack of facilities will directly affect talent introduction and personnel recruitment. They hope that the Eco-city will speed up ancillary facility construction. An example is in the construction of the southern area (the initial area) of the city, which is scheduled for completion in 2013; the current construction progress is far slower than expected. The construction of facilities for residents is still lagging behind, even though 80% of the initial area has been completed. The new school term (primary school, kindergarten) has begun and the construction of hospitals has already been kicked off but not facilities for cultural and sports activities and for the elderly.

Waste Management

The garbage transfer boot device has been built; however, as the occupancy rate of the park is not high, enabling the garbage transfer boot alone cannot achieve the design intent. Another probable reason for the delay is that the design standards of the garbage transfer system are so high that ancillary facilities and equipment could not meet the stipulated requirements.

Investment and Financing Problems—Unitary Investment Channel

Investments in the Eco-city are derived largely from the government's initial investment, real estate companies, registered enterprises and funds from banks, such as the World Bank. The current investment channels are relatively unified and come mainly from the central government's investment. As the local governments adopted a hands-off approach, they play no part in the project. In the meantime, no mechanism to attract social capital has been built. These developments have led to a late-stage development funding gap appearing, causing a delay in the construction of public facilities.

Eco-city Management Problems

The CMC continues to use the traditional administrative management mode without reflecting on the requirements of the Eco-city. In the three-level management mechanism, the CMC plays a major role on behalf of the Tianjin municipal government. The management mode of CMC has a giant department administrative management system, consisting of nine bureaus and two offices. Politically, the CMC still plays the role of an "administrator"

without realising that modern urban management requires the administrative authority to be a “servant” rather than an “administrator”. There is also a lack of transparency as the CMC does not disclose Eco-city construction information totally. The CMC seems pretty out of reach for researchers and a lot of data information cannot be obtained. In addition, although regulations provide that residents are given autonomy in community management, they are not implemented in practice.

Industrial Development Problems

Many Registered Enterprises, but Few have Settled In

Many registered companies at the Eco-city have yet to settle in, leading to the low occupation rate. The inadequate public facilities and poor transportation network have made it difficult for enterprises to attract talent. As a result, many companies defer settling in or adopt a wait-and-see attitude.

Unified Settle-in Enterprise Type, Hard to Form Industrial Chain

Leading industries of the new Eco-city include green architecture, information technology, culture and dressing, and energy saving and environmental protection; the industry with the largest number of enterprises registered and settled in is the cultural and creative industry, which is mostly settled in the Animation Park industrial area. An analysis of the enterprises in the Animation Park shows that the enterprise type that has settled in the city is of a single industry, which is conducive to the development of certain types of industrial clusters, but not for the lateral connection and association of enterprise products in the long run. It will not only block the development of enterprises, but will make it difficult for the enterprises to form a complete industrial chain.

SOLUTIONS

Improve Laws and Policies of the Eco-city

The development of the Eco-city is guided by nine regulations. These regulations, especially the Administrative Regulations of Sino-Singapore Tianjin Eco-city, draws on the experience of Singapore’s urban planning, environmental protection and sewage treatment, and blend with the local characteristics of the city. However, some of the specific institutional needs of the Eco-city system are yet to be satisfied, such as implementing evaluation standards; incorporating resource and environmental costs into the GDP accounting system; utilising an environmental impact assessment system; launching digital urban construction; forming a real-time, continuous and accurate monitoring system; determining the various indicators of economic operation, energy consumption and ecological environment quality; and establishing an information disclosure system, a social supervision system and a public participation mechanism. To guarantee the scientific development of the city, the city administration would have to administer control in the middle stage, conduct audit after completion, and supervise all construction projects during the whole process.

Strengthen “Bottom-up” Impetus Based on “Top-down” Decision-Making Process

Apart from the traditional “top-down” decision-making mode of economic and social development in China, the city would also do well to make effective use of the “bottom-up” force. The “bottom-up” mode refers to two levels of support with the first being local government investment in the eco-city construction; the current hands-off attitude is a reflection of the negative attitude of the Tianjin municipal government and the Binhai New Area government. The construction and development practices of other foreign ecological cities indicate that attracting capital is the key link in the whole processes, with construction funded mainly by the local governments. It is thus essential that the local government changes its hands-off approach, so as to strengthen the two levels of support needed. The second level of support is the promotion of publicity of the Eco-city, and to set up a public participation system and social capital attracting system. A well-publicised campaign for the city will boost people’s and enterprises’ confidence in the ecological city, thus encouraging participation from different types of industries. This “bottom-up” mode can help promote future construction and sustainable development of the city.

Evaluate and Improve the Current Index System

There is a need to revamp the index system and adjust relevant standards, drawing on the experiences of foreign ecological city constructions to suit local characteristics. The city could supplement the index system with an evaluation index system to guide project implementation, quantify the energy, resources and environmental benefits, evaluate the effects of city construction, and provide feedback. As city construction relates to the natural environment, and the social and economic conditions of the whole city, the operation indices at the final stage will be implemented in urban spatial planning.

Complete Green Education System to Cultivate Public Ecological Awareness

Cultivating Ecological Awareness

The various ways to cultivate public ecological awareness include: formulating a code of ethics and a standard of conduct pursued conscientiously and gradually by society; promoting green ways of production, living, consumption, travel, etc; improving the consciousness, initiative and creativity of enterprises and the public to protect ecological environment; expanding environmental protection voluntary groups; encouraging public welfare of environmental protection; and promoting consciousness of environmental protection in society. The CMC can also use the mass media to propagate the importance of environmental protection and homeland greening, thus cultivating people’s sense of responsibility towards the Eco-city.

Establish Thorough Green Education System

The perfection of the green education system could be carried out at three levels. First, emphasise high-end education as well as science and technology research. The University of Science and Technology, including the exchange and training of international ecological environmental protection, the national institutions and key laboratories of ecological environmental protection, and environmental and ecological branches campuses established by national and local famous universities, belong to the first level.

Second, build demonstration bases akin to those in Japan, which emphasises the construction of demonstration bases of the sewage library's ecological protection education. Through these bases, environmental education activities for schoolchildren and the public could be conducted.

Third, focus on basic environmental education networks. The experiences of Suzhou Industrial Park and Suzhou New District could be drawn on. Create a series of national and provincial green schools and promote green communities, green enterprises, green hotels, green family etc. in a society where everyone is concerned about and involved in environmental protection.²⁵

Set up Related Systems and Promote Public Participation in Planning, Construction and Management

Participation by the public can secure their support for the planning, construction and management of the Eco-city and establish interaction between the government and the public.

Therefore, relying on the government alone to safeguard the core values of public participation is unrealistic; related policies and regulations must also be established alongside and a code of construction practices implemented to effectively overcome interference by the government in the area of the environment during the construction of the city.

Strengthening propaganda and education for the public to arouse public concern for the construction of the Eco-city will go a long way towards cultivating public understanding and support of the Eco-city planning and management.

Expand Investment and Financing Channels, and Resolve Problems Brought about by the Lag in Public Facilities Construction

Actively explore diversified financing channels and vigorously promote the commercialisation operation of intangible assets. The ways to raise funds include auctioning operational rights and naming rights of bridges, roads, squares, bus lines, public toilets, street lamps and newsstands. To encourage investments in communication constructions, discounts, subsidies, government- or private-managed co-construction and issuing of government bonds for com-

²⁵ Tianjin Committee of China Zhi Gong Party, "Suggestions on the Construction of the Sino-Singapore Tianjin Eco-City", *Port Economy*, 2008 (9), p. 32.

munity public facilities could also be offered. Likewise, donations could also be solicited from enterprises, social organizations and individuals.²⁶

Establish Scientific City Development and Management Mechanism

This could be done by exploring the market operation mechanism, perfecting the laws and regulation system, speeding up market system development, giving full play to the positive role of market mechanism in resource allocation in the means of production, and speeding up the construction of the environmental protection industry system. In the meantime, it would also do well to promote the socialisation, marketisation and industrialisation process of the Eco-city construction and establish an effective market supervision system so as to build a fair, open, healthy and orderly market system.

In terms of policies, just like the granting of franchise rights and extension of project operation duration, as well as implementing market-oriented measures such as BOT (Build Operate Transfer) and DBO (Design Build Operation), promoting the marketisation of energy and municipal and sanitation facilities and construction will be needed.²⁷ Other measures include innovating on the community management service mechanism and setting up a bottom-up mode with the government leading and with participation by residents so as to connect the government with the grassroots and to build a harmonious social community. The CMC may also consider inviting residents to its committee meetings to discuss problems and interact with CMC staff.

Strengthen Communication and Achieve Technology Transfer

Foreign experiences attach great importance to ecological city theory and application research and special funds have been established for these purposes. The Cleveland municipal government for instance has set up a full-time ecological city foundation and launched an ecological city construction fund for ecological city publicity and provision of information services, job training, scientific research and extension. Some countries even went a step further by ensuring legal protection of public participation, implementing diversified ways of participation, and utilising renewable green energy and ecological construction technologies.²⁸ With time, the Eco-city could also introduce ecological technology innovations, with the Eco-city as a demonstration site, to other developing countries.

BRIGHT PROSPECTS AHEAD

As China is new to the construction of an ecological city, the exploration and practice of the Sino-Singapore Tianjin Eco-city will provide valuable experiences for other Chinese city

²⁶ Wang Yuequn, "Reflections on the Construction of Sino-Singapore Tianjin Eco-city Communities and Legal Environment", *Tianjin Administrative Institute*, 2009 (1), p. 56.

²⁷ Lin Xuefeng, "Sino-Singapore Tianjin Eco-City: Demonstration City of Sustainable Development", *Urban and Rural Construction*, 2009 (11), p. 13.

²⁸ Sun Jianguo and Wu Kechang, "Research of China's Eco-city Construction Based on Eco-city Theories", *Special Zone Economy*, 2007 (1), p. 132.

construction. As the national demonstration construction area, the Eco-city has made huge achievements in the planning and construction despite the problems faced. It is foreseeable that in the continuous exploration of theory and practice, the Sino-Singapore Tianjin Eco-city is on the right path to achieving its desired goal.

Eco-cities in Action: Sustainable Development in Europe – Lessons for and from China?

Judith Ryser¹

www.urbanthinker.com

The “EU-Asia Dialogue” aims to contribute to sustainable development policies. Encompassing “climate change diplomacy” and “eco-cities” in its topics for “Shaping a common Future for Europe and Asia”² reflects an aspiration to share the finite resources of One Planet Earth equitably. It makes sense to focus on Asia’s meteoric growth and contrast it with Europe’s gradual decline to generate synergy between the dynamism of Asia and Europe’s tentative efforts to live within its ecological means.

Any discussion on sustainable urban development needs to encompass more than political decision makers and academic researchers. The world of practice lies between political decision-making and academic knowledge generation and dominates existing reality. Although subjected to political objectives – often reluctantly, and guided by scientific knowledge – at best, market forces motivate those who intervene and are changing the real world in a predominantly neo-liberal era. Thus, this paper focuses on practice as the key agent of change and its room for manoeuvre between policy and understanding in a world that is evolving relentlessly, at a phenomenal speed and scale in Asia and at a slowing pace in Europe. Reciprocal learning is benefiting both worlds; hence a few examples are discussed which may contribute towards building bridges between Europe and Asia in the field of sustainable development, with particular attention to eco-cities.

¹ Judith Ryser is urbanist, CityScope Europe.

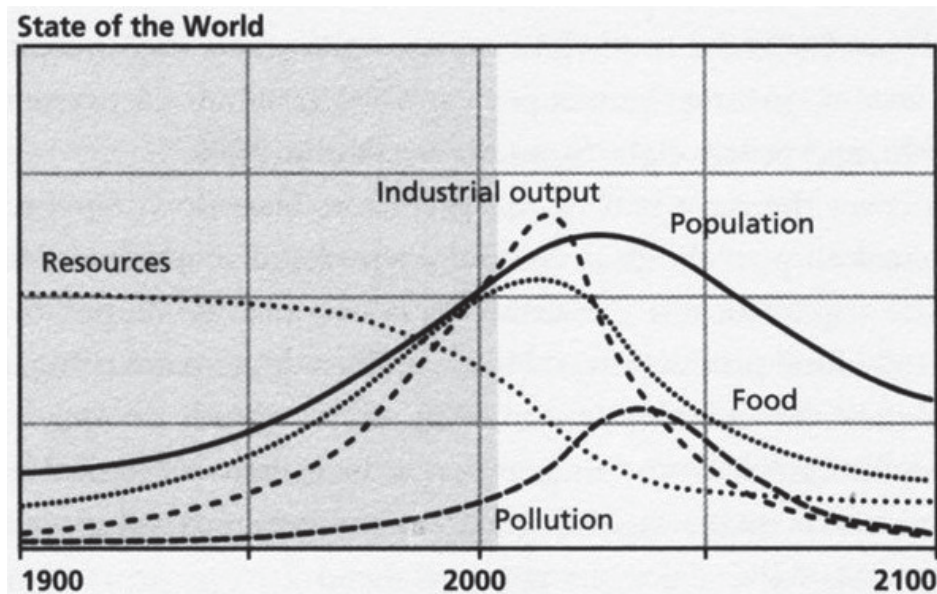
² <http://www.eu-asia.eu/the-topics/>

1. WHAT IS ECO-DEVELOPMENT?

Both research and politics have raised awareness of the need to live within the planet's ecological capacity. To name but one research and one political wake-up call: the Club of Rome³ had alerted the world about living above its ecological means in the 1970s.

Worldwide Limits to Growth: Input-Output Model.

Limits to growth revisited. Physicist Graham Turner (Australia) finds that predictions of unsustainable business-as-usual growth match real evolution well.



Source: Meadows et al, Forrester Institute IMT 1972. The Limits to Growth, A Report of the Club of Rome. <http://www.smithsonianmag.com/science-nature/Looking-Back-on-the-Limits-of-Growth.html>

In the 1980s, the Brundtland Report⁴ had defined sustainability and urged governments to endorse it. Significantly, the notion of “eco-city” has been coined by practice. Richard Register⁵ has defined and built⁶ eco-cities and only later have governments taken up the idea in their attempt to make urban development more sustainable.

³ Donella Meadows, Dennis Meadows, Joergen Randers, William W Behrens, Forrester Institute MIT, 1972, The Limits to Growth, A Report for the Club of Rome’s Project on the Predicament of Mankind, Potomac Associates Book, Earth Island Limited. They were not the first to relate population growth to the available resource of the planet. See also Thomas Malthus (1798, An essay on the principle of population).

⁴ Our Common Future, Report of the Brundtland Commission, 1987, Oxford University Press.

⁵ Richard Register, 1987, Ecocity Berkeley: Building Cities for a Healthy Future, North Atlantic Books, with definition of “ecocity”. <http://www.ecocitybuilders.org/why-ecocities/the-solution/ecocity-definition/>

⁶ Past Ecocities conferences. http://www.ecocity2011.com/sommets-ecocite-anterieurs/default_e.asp

1.1 History

The idea of ecological development has a long history.⁷ From the UK perspective, it could be argued that in more recent times, Ebenezer Howard's idea of "garden cities"⁸ was a reaction against the worst excesses of industrialisation and urbanisation. A modernist version, New Towns, was conceived and implemented in the UK by planners after the Second World War.⁹ Both these models survive in the British planning system and, more significantly, in the public mind.

Bottom-up movements created and live in Transition Towns, originally in Kinsale, Ireland¹⁰ from where they spread to the English West Country and continue to be promoted by the Transition Network initiated in 2005 as community-led responses to climate change. Transition Towns are local and self-sufficient. Aiming at resilience they focus on locally grown food, community-owned power stations, local currencies and many other small-scale actions, in the hope that their cumulative effect will bring about more sustainable living by improving quality of life without growth. There are more than 1000 transition initiatives in more than 40 countries.¹¹ Interestingly, the majority are initiated in the developed world, possibly as a reaction against its unsustainable living style.

A recent top-down approach to eco-developments was initiated by the UK government in 2007, in the form of a competition for subsidies to build ten Eco-Towns in England¹² as a demonstration of a sustainable form of new towns.¹³ Sixteen cases were selected from over 50 applications but only one – Northwest Bicester in Oxfordshire – has survived, albeit not fulfilling all ten eco-town standards laid down in the Planning Policy Statement.¹⁴ Most

⁷ For a short account, see Judith Ryser, *Asian Eco-Cities, a critique*. In: *FuturArc, the voice of green architecture in Asia*, march-April 2013, I Volume 29.

⁸ Ebenezer Howard. 1898. *Garden Cities of Tomorrow, a peaceful path to real reform*. S Sonnenschein & co.

⁹ The Abercrombie Plan for London in 1944 and 1945 has conceived eight self-sufficient new towns beyond a green belt to contain London and to alleviate its congestion.

¹⁰ http://www.localplanet.ie/index.php?option=com_content&task=view&id=191&Itemid=49

¹¹ <http://www.guardian.co.uk/environment/2013/jun/15/transition-towns-way-forward>. According to the transition network, there are 1107 initiatives in 43 countries in 2013 registered on their website, 555 in Europe and 9 in Asia (6 in Thailand, 2 in India, 2 in Myanmar, 3 in the Philippines and 2 in Japan). <http://www.transitionnetwork.org/initiatives/map>.

¹² All references to eco towns have been archived from the government site of the department for communities and local government which initiated the eco-town competition, <<https://www.gov.uk/government/organisations/department-for-communities-and-local-government>> and the only eco-references of the government site <www.gov.uk> related to energy.

The most recent news releases on the NW Bicester eco-town on the local authority site dates of 27 May 2011.

¹³ http://www.evi.com/q/facts_about__eco-towns

¹⁴ PS4. 30% affordable housing, zero-carbon excluding transport, 40% green space, increasing above mandatory standard recycling of waste, level 4 (not the highest) Code for Sustainable Homes, one job opportunity per house, services in walking distance, available from the outset of the development, public transport link at ten minutes distance with IT information, mixture of housing densities and types, and active participation of citizens in local governance.

proposals were on government-owned land in remote areas. Benefiting from discounted land costs, they were often perceived as competing unfairly with mainstream planned town expansions. Moreover, their “sustainable” credibility was questioned as they required unsustainable infrastructure provision while town expansions could benefit from marginal improvements of existing settlements.

Pressures arising from the financial crisis and austerity programmes since the late “noughties”¹⁵ have pushed environmental concerns down the list of political priorities. The National Planning Policy Framework¹⁶ which has consolidated all the governmental planning advice into a 50-page document in 2012, officially to “achieve sustainable development”¹⁷, is seen by many as one of the effects of relaxing the sustainability policy agenda.

While the government seems to have abandoned interest in eco-towns,¹⁸ “sustainability” solutions for urban development continue to be supported by the TCPA (Town and Country Planning Association¹⁹) and the IFHP (International Federation for Housing and Planning²⁰). The former was set up as the “Garden Cities Association” in 1899 and the latter, a professional network also founded by Ebenezer Howard, has just celebrated its centenary.²¹ No similar institution has been created among Asian countries to promote sustainable development, including eco-cities to cope with rapid, polluting industrialisation, urbanisation and related population displacements.

1.2 Contemporary divergence of sustainable development strategies

What transpires from three selected examples in which the author was involved, a critical desk study of eco-cities in Asia,²² professional design information on China²³, and a related designer exchange in the UK²⁴, is that there exists a wide spectrum of development approaches, ranging from neo-liberal, speedy urbanisation to sustainable, integrated, organically evolving developments.

¹⁵ 2000-2010.

¹⁶ NPPF. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

¹⁷ “Securing the Future” sets out the UK Sustainable Development Strategy, guided by UN Resolution 42/187’s definition of sustainable development: meeting the needs of the present without compromising the ability of future generations to meet their own needs.

¹⁸ In April 2011, the coalition government decided that only NW Bicester had to reach the “sustainability standards”, while the other proposed eco-towns need to reach only current building requirements.

¹⁹ <http://www.tcpa.org.uk/>

²⁰ <http://www.ifhp.org/>

²¹ IFHP congress 6-11 May 2013, London, “A Tomorrow for Cities”. Among the themes were “lessons for climate resilient cities” and “from garden city to eco-city”.

²² op. cit.

²³ Urban Design 127. Summer 2013. Urban Design Group Journal, UK, topic: China, pp. 12-37.

²⁴ Urbanism in China, landmark event organised by the Urban Design Group in London on 9 July 2013.

The desk study and the articles on urban design in China reflect the speed with which cities are being built in Asia, with little initial concern about sustainability, an issue addressed only at a later stage. The divergent role of designers in the urbanisation process in Asia and Europe became apparent at the designer exchange attended in equal numbers by Chinese and European designers. Some Europeans seemed envious of cities arising from the ground at neck-breaking speed apparently uninhibited by government regulation in China, while some Chinese designers were seeking inspiration from the slow movements in Europe.

Is there a way to benefit from both speed and sustainability by combining knowledge and experience across cultures? Hiring a Chinese designer in Europe is not sufficient for entering the Chinese development market, Iris Cai, a Chinese business-woman warned when talking about the importance of Feng-shui and other Chinese cultural characteristics and customs. Conversely, there was little discussion about how the Chinese are penetrating the European development market, although they are obviously successful, judging from the many large-scale developments which are going up in London and, for that matter, elsewhere in Europe, with Asian investment and often for Asian clients. They bring with them, admittedly at a lesser speed, similar displacements as in Asia, and similarly such speculative spaces are standing empty, perhaps not at the scale of Chinese ghost towns²⁵ but taking up precious space for much-needed housing for the growing population in cities like London.

1.3 Awareness, levels and unfolding of sustainability

Equally divergent and possibly intractable is how to approach sustainability at various levels and scales. Natural eco-systems and their interdependencies can be an inspiration and have been used at various stages in planning and design.²⁶ However, like with any borrowed theories from natural sciences by social sciences, transposition from scientific knowledge into urban development tends to be fiendishly difficult.²⁷ The use of scientific theories may prove almost impossible in the messy world of combined material, environmental, economic, social and cultural reality and its dynamic.

Of concern to sustainable development is that, transferring models of thinking which may apply to a particular scale, e.g., at the level of the city, may not be appropriate at the neighbourhood scale, or conversely, at a supra-regional level. It means that findings at the level of buildings cannot simply be used cumulatively to reach sustainable development solutions at the level of neighbourhoods, let alone for a city as a whole. Different criteria and especially a combination of factors affect spatial levels in various, possibly complementary but also contradictory, ways and are ultimately place-dependent. Vertical links and interdependencies are also relevant but rarely included in detailed studies or specific developments,

²⁵ <http://www.businessinsider.com/pictures-chinese-ghost-cities-2010-12?op=1>

²⁶ For example, planning: the Chicago school of Robert E Park and Ernest Burgess in the 1930s to deal with the urban-industrial city; design: Frank Lloyd Wright or Alvar Aalto.

²⁷ Eric Beinhocker. 2006. *The Origin of Wealth: The Radical Remaking of Economics and What it Means for Business and Society*. Harvard Business School Press. He presents a critique of failed economic theory based on misguided borrowing of natural science theories.

not least because of their complexity. There is a lack of information and knowledge of the dynamic of change at each of these levels, whose complexity increases with size. Nevertheless, it is important to include some dialectic relations between spaces and their development potential at different spatial levels because they contribute to more appropriate spatial policies or design solutions. Finally, requirements to insure sustainability vary through the lifecycle of policies and their implementation. Different criteria and priorities apply at various phases of the sustainable development process, including when these spaces are in use and finally redundant and in need of regeneration.

1.4 Design approach to sustainable development: “landscape intelligence”

The complexity of levels and their relations, as well as the lack of evidence should not prevent either researchers or designers from exploring possible connections between natural ecosystems and development processes at regional, urban or local scales. The approach of the Fundacion Metropoli (FM)²⁸, which it named “landscape intelligence”²⁹, is such a process. When preparing spatial development strategies the FM team studies morphologies which inspire it for its proposals of spatial transformation, ranging from the scale of regional landscapes to cities, urban quarters and individual buildings. Articulations between these levels can be explored once the morphological characteristics are detected at a particular scale. What is sought is the essence of what I would call the “archaeology of spatial memory” of an area of potential intervention before working with it rather than against it, or worse still ignoring it, something that tends to be practised by “wow” architecture.

Spatial memory, and for that matter its symbolic characteristics vary between cultures. It is ultimately contextual and place-specific. For that reason, the enormous differences between Europe and Asia at every level, as well as in regard to every aspect of way of life, history, change and future aspirations need to be kept in mind when working on sustainable development strategies and their implementation. The same limitations apply to the transfer of knowledge between widely differing cultures. In reality, a lot of direct borrowing is taking place. Images of buildings and neighbourhoods are copied from magazines, and styles of design and construction are transferred from one culture to another into completely different contexts, climates, traditions, and not least values; moreover, technologies are resorted to which may not be appropriate elsewhere. This raises a host of questions beyond this paper about the pertinence of direct transfers of sustainable design solutions which may be adequate in one place but counter-productive in others. Nevertheless, it cannot be ignored that issues of transferability, intercultural communication and context-related understanding are crucial for the EU-Asia dialogue.

²⁸ <http://www.fmetropoli.org/>

²⁹ Judith Ryser (ed. author of text). 2010. Fundacion Metropoli, Landscape Intelligence, Visions and Projects of the Fundacion Metropoli. Fundacion Metropoli.

Returning to “landscape intelligence”, a similar two-way approach is used to find connections between cities and climate change³⁰ as a basis for design principles which apply to an “eco-city”. It is important to recognise though that designers will always have to work with very imperfect knowledge and incomplete information. What matters is to put any intervention into its wider context. Such an approach has also been developed by CABA³¹ when studying the relation between scales of well established eco-designs.³² Translated into the link between climate change and design this would mean considering the ecological footprint, as well as climatic and other characteristics and limitations of the site. Such considerations and awareness of constraints apply to an even greater extent when working with assumptions regarding economic, social and cultural dimensions of areas for which development strategies are to be devised.

2. CAPTURING THE VALUE OF “SUSTAINABILITY”

The question is how to propagate genuine sustainable development. In a world dominated by the market economy, the social and environmental dimensions of sustainability tend to be subordinated to economic concerns, especially in times of economic crisis and austerity. It is therefore important to make an economic case for sustainable development. The Urban Design Group staked out such an approach at its 2012 conference on the “Value of Urban Design”.³³ Reaching beyond the format of a dialogue, its objective was to establish a “trialogue” between the urban design community, policy makers and the development industry. This undertaking discovered complementary innovative approaches of all three interest groups, together with common grounds between them. The pursuit of such a rapprochement was due in part to changes in attitudes of those who use and purchase urban space: civil society as well as opinion leaders and the general public, which are also among the main beneficiaries cited by the EU-Asia Dialogue.

2.1 People’s perspective

Many design professionals experiment with tools to improve interactive dialogue with those who will eventually live, work and play in sustainable neighbourhoods. They act as a bridge between academic research findings and practical implementation, something they consider indispensable for building up not only their body of knowledge but also their know-how to stimulate innovative and creative contributions towards more sustainable environments

³⁰ Judith Ryser & Gabriel Escobar. 2010. Climate Change and the Cities of the Future”, Art, Technology and Economics against Climate Change. In: Climate Change and the Cities of the Future. Proceedings of ECF conference. Alcala, Spain 2008. ECD, European Climate Forum.

³¹ CABA: Commission for Architecture and the Built Environment.

³² Matt Bell. 2007. Sustainable cities and the place of good design. CABA (Commission for Architecture and the Built Environment) of eco-designs.

³³ Urban Design, Issue 126, spring 2013, topic: the value of urban design, presenting a large number of papers presented at the 2012 conference.

in practice. Roger Evan's "Model Lab" is a back-to-basics approach of working in three dimensions instead of computer-generated images projected onto flat screens. His models have proven to be a playful way of engaging the participation of the public, and it has also become an on-going learning process for both parties. Plot-based urbanism is promoted by Jonathan Tarbatt to empower local communities in requiring more sustainable urban environments. There is no place for complacency though, according to Meredith Evans, who has long-time experience as corporate director of a new town. He warned against the one-size-fits-all pattern-book approach, a lazy option which is undermining the innovative approaches harnessed by joining up the creative energies of designers and people.³⁴

While public participation is practised in many places and in many ways, with different techniques incorporated in the planning process, the effectiveness and usefulness of involving the public in the social, economic and environmental transformation of their area is still in the making. Longer-term monitoring of the outcome of such practices is not widespread, not least because there is no clear accountability and responsibility and, most of all, no budget for such a process. Especially during rapid and large-scale urbanisation – as takes place in many places in Asia – populations residing in such areas of transformation are in a weak position and of minor importance to the development industry. The intractable questions remain: whether gentrification is path-dependent on urban regeneration, how it can be assessed overall, not only in purely monetary or macro-economic terms and, most importantly, how it affects existing populations.

2.2 Innovative development industry?

Surveyors are the obvious professionals to find a calculus for the value of urban design. Yolande Barnes of Savills, a global property management company, advocates new ways of calculating value for the commercial sector of the building industry, as well as for urban designers. One of the greatest hindrance of such an approach is the traditional way of calculating real estate value based on the built area, while quality of design, sustainability and value are reflected and experienced in the neighbourhood as a whole – its overall feel, the public realm, and the amenities. The value of sustainable environments is reflected in place-making, not in the price of individual buildings. What is needed is for the property industry to revert its compartmentalisation, reflected in financial purchase arrangements and marketing, and to value places as a whole. It would be regrettable though, if this trend would only materialise in gated communities and not in urban environments generally.

Some developers include the value of urban design overall in their schemes in an unconventional way. Examples are the regenerated market square in Bermondsey in south London, or the high quality of streets in the village developed by the Prince of Wales in Poundbury Dorchester. Another developer has taken up the challenge to incorporate the value of design on a difficult-to-deliver brown field site development in Birmingham. A public sector "devel-

³⁴ Meredith Evans voiced these views at the Urban Design conference organised by the Urban Design Group on the value of urban design, in Oxford in 2012. See Urban Design Issue 126, Spring 2013

oper” of the new town of Almere near Amsterdam has changed its approach after stagnation by encouraging and facilitating sustainable self-build.

2.3 The contribution of researchers

Quantifying quality is a continuous challenge also for academic research; moreover the real challenge is to achieve it through other than monetary measurements. A number of pioneering approaches were shown at the Urban Design conference. An innovative approach, the “5 I” Framework, was developed by a government-sponsored pilot scheme to identify the value creation of urban design.³⁵ The 5 “I” identified were: innovation, linked to initiative, implementation, improvisation and incentives. What mattered was their interaction to create value through urban design. Academic research carried out at Cardiff University quantified the value of good design in high streets which became even more under threat during the recession than before by large-scale out-of-town shopping malls. Research by Sarah Milliken at the University of Greenwich quantified the value of green spaces, perhaps the most difficult case to make in the light of spiralling land values. Two examples are discussed in more detail below: the “international eco-cities initiative”³⁶ and the “Proyecto Cities methodology”.³⁷

2.4 Role of decision makers

A two-way process seems to be under way. Politicians are in a position to advance the sustainability agenda. However, the short-lived “eco-town” initiative discussed above demonstrates the frailty of political support for objectives such as “sustainability”, which are difficult to grasp, may become tangible only over the longer term and lack a ribbon-cutting quality. It is equally important therefore to “sell” the value of good urban design to elected politicians, keeping in mind that they are instrumental in promoting such innovative approaches in their areas. Undoubtedly, this can be achieved more easily if good urban designers form part of their in-house teams to evaluate design proposals.

Politicians are not the only decision makers though, especially in complex and as yet little understood fields and their essentially unknown longer-term consequences, such as sustainable development. Built environment professionals claiming exclusive know-how, researchers under the guise of objective knowledge, as well as developers through their lobbies, all take an active part in trying to influence decisions, be they in favour or against sustainable development. An example is a stand-alone incentive which was initiated by the “Knowledge centre for home design”³⁸ to foster value of design. It consisted of a pre-completion award for house builders who were recognising urban design quality at the point of sale, which came to be reflected in the sale price.

What these approaches carried out by decision makers, academic researchers, the development industry and design professionals have in common is that they are incorporating

³⁵ http://www.atlasplanning.com/page/about_atlas.cfm

³⁶ <http://www.westminster.ac.uk/ecocities-leverhulme>

³⁷ Developed by the University of Pennsylvania and Fundacion Metropoli.

³⁸ <http://www.designforhomes.org/>

the concept of sustainability in their activities as politicians, academics, practitioners and entrepreneurs, be it in cooperation or in contradiction with each other. Either way, putting this debate in the public realm may contribute positively to building up the pre-conditions for a change in attitude towards the need for sustainable development, maintenance and use of the man-made environment.

2.5 Joining forces – an integrated approach to eco-development: BedZED – One Planet Living

What has become a “classic” of a sustainable and resilient community neighbourhood has been a pilot experiment of close cooperation between decision makers, scientists, designers, developers and users.

The Eco-Quarter BedZED in South London.
BedZED, the first eco-quarter in London which integrates all known ecological measures. Architect Bill Dunster, eco-consultant, Bio-Regional.



Photo: Judith Ryser.

The social entrepreneurs Bio-Regional initiated BedZED, an eco-neighbourhood in south London during the 1990s recession. One important aspect is that BioRegional³⁹ was already operating in that area and wished to expand without moving. Their approach was known and appreciated by the local authority, which has adopted subsequently their principles of sustainable community development for a much larger industrial area, Hackbridge, near this pilot project, in need of regeneration. Third, they mobilised a house builder, Peabody, with long-term philanthropic credentials, who had provided housing for workers in the 19th century and pioneered socially and now environmentally relevant solutions ever since.

BioRegional believe that enlightened self-interest is a very sound motivation. In their view, the extra love and attention which actively involved users are attributing to such projects pays dividends, not only in terms of their improved quality of life but also as long-term value of their asset. Together with the architect Bill Dunster, who is both working and living in BedZED, and Arup engineering, who operate throughout the world and a lot in Asia, they designed an experimental scheme which is under constant monitoring and adjustment. Their

³⁹ <http://www.bioregional.co.uk/>

aim is to become resilient to external factors like energy and food costs, while creating new jobs in the local economy. Through their concrete experiments, they diffuse their One Planet Living⁴⁰ approach, based on ten ecological principles, throughout the world.

3. ECO-CITIES – THE SUSTAINABLE URBAN FORM OF THE FUTURE?

From the preceding discussion, it is clear that there does not exist any global political consensus on sustainable development, and even less among the development industry. Similarly, there is no global consensus regarding the concept of eco-city. It ranges from an idealised idea of ecologically healthy living to pragmatic devices which provide cities with green credentials. From a design point of view the spectrum includes utopia, in Europe as autarchic bucolic self-sufficient utopia promoted by social reformers, reflected in the garden cities movement and taken up by the green movement; in Asia as contemporary bioclimatic vertical utopias symbolised by Ken Yeang's green skyscrapers based on "ecomimesis" or Kenzo Tange's metabolic underwater cities. To some extent, the lack of a clear definition of eco-city can be seen as an advantage as it enables enlightened city leaders to experiment with incorporating ecological principles into their cities in a wide range of ways according to diverse principles.

To-date, there exist only a few whole eco-cities. They are diverse, ranging from Masdar city⁴¹ in the Middle Eastern desert to the more traditional-looking European eco-cities. The most quoted among them are Vauban Freiburg-im-Breisgau in Germany and Hammerby Sjostad near Stockholm in Sweden. Many others are self-declared "eco-cities", meaning for example a change of attitude towards sustainability in existing cities, such as Basle (Switzerland), Heidelberg (Germany), or Helsingor-Helsingborg (Denmark-Sweden). The classification presented in the Review of Joss et al.⁴² shows that many "eco-cities" have incorporated only one or two aspects of sustainability, such as cycling, waste disposal or energy efficiency. Most of them are small, or are extensions to existing cities, rarely standalone developments. For example, an often-quoted pioneer, Logrono eco-city in La Rioja in Spain,⁴³ is in effect a quarter with 3000 social dwellings. Also, attitudes towards eco-cities in Europe vary widely. For example, the Germans are sympathetic to bottom-up self-management and the opportunity to sell renewable energy to the grid, while the attitude of the Finns remains anti-green, perhaps because they have it in abundance.

This diversity and relatively small scale of eco-cities or eco-quarters is reflected in the recommendation to focus on middle-size cities which accompanies the seven United Nations eco-cities objectives: (1) keep green urban mosaic, (2) compact cities, (3) diversified local economies, (4) network patterns extended, (5) green water and energy-efficient urban

⁴⁰ <http://www.bioregional.co.uk/oneplanetliving/what-is-one-planet-living/>

⁴¹ masdarcity.ae/

⁴² Simon Joss, Daniel Tomozeiu, Robert Cowley. 2011. Eco-Cities – Global Survey 2011. Eco-City Profiles. University of Westminster <http://www.westminster.ac.uk/?a=119909>

⁴³ <http://www.dezeen.com/2008/09/27/logrono-montecorvo-eco-city-by-mvrdv/>

environments, (6) protect eco-systems, (7) green industries and jobs in clusters.⁴⁴ The UN criteria may have arisen from such small and medium-size eco-developments. The large-scale cities which have mushroomed in China and elsewhere in the developing world cannot be construed as genuinely ecological.

3.1 The example of Sarriguren, a genuine eco-city

Sarriguren can be considered a bona fide eco-city at an urban scale which incorporates a number of combined ecological principles.

Sarriguren, Pamplona Navarra, innovative Spanish eco-city designed by Fundacion Metropoli. First eco-city built in Spain, as extension of Pamplona. Masterplan.



Source: Fundacion Metropoli.

Situated on the outskirts of Navara, Pamplona, Sarriguren follows ten principles devised in terms of performance specifications which gained Sarriguren the 7th European Urban and Regional Planning Award in 2008 from the European Council of Spatial Planners.⁴⁵ They are: nature as integral part of urban design, conservation of rural settlement structure, priority of public transport, cycling and walking, diversity of housing, integration between housing and work places, high quality and diversity of public realm, bioclimatic architectural design, commitment to innovation, and high-quality natural environment, within a well-confined physical framework for the eco-city.

⁴⁴ See also, the United Nations Sustainable Development Knowledge Platform <http://sustainabledevelopment.un.org/index.php?page=view&type=1006&menu=1348&nr=66> and in particular the International Ecocity Framework and Standards Initiative (IEDS)

⁴⁵ ECTP. <http://www.ectp-ceu.eu/>

The masterplan for Sarriguren eco-city designed by the Fundacion Metropoli identified areas of intervention, produced strategies for the reduction of green house gas emissions and proposed innovative eco-features. The proposals were derived from the Proyecto Cities' analysis⁴⁶ of its components of excellence: urban setting as the historic centre, the universities, biotechnology, teaching hospitals and related applied research institutes, ample green areas, rural settlements, viable infrastructures connecting the city to the outside, high value-added industrial specialisation and technological development capacity. These components characterised the attractiveness, specificity, current success and potential development opportunities of the site. Besides enhancing locational and natural assets, the Fundacion Metropoli devised its own eco-design criteria which it is applying to its conceptual as well as practical design of eco-cities.

Sarriguren became an extension of existing innovation corridors where high-tech production and services are located. Eco-boulevards with sustainable public transport are connecting the eco-city with the existing urban fabric, together with cycle lanes and footpaths to the surrounding nature. It is using the eco-technological infrastructure as part of the landscape design. The housing built by the local housing corporation encompasses a wide range of types and tenures to achieve a social balance. All were designed with active and passive energy efficiency features, renewable energy supply, complete water cycle and innovative communication technologies. They were submitted to a certification process to prove their low energy consumption and carbon emissions. The building programme included the refurbished historic village, eco-city gates, viewing towers in the park, blocks of flats, single family houses and live-work premises. Similarly, a range of job opportunities and places of learning were foreseen to limit travel to work. Land reserve and infrastructure connections enable the eco-city to grow in the future.

4. QUANTIFYING ECO-CITIES

Eco-cities could be construed as a particular case of fulfilling the need for more sustainable development. Those who live in eco-cities and experience a more sustainable environment may be most inclined to consider it no longer as a marginal aspiration but as a normal way of life, which would thus become diffused more widely. Indeed, various surveys⁴⁷ seem to show a broad consensus on the major attributes of sustainable development which could be implemented in eco-cities, namely self-sufficient water and energy supply, optimal recycling of nutrients and waste, eco-friendly public transport, integration with local characteristics and needs, as well as the need to combine economic with environmental performance. However, the lack of a universal model of an eco-city, and the fact that eco-indicators are not considered plausible leaves considerable slack for inaction. It makes sense, therefore for researchers to concentrate further on methods to establish an evidence base to make a case for eco-cities.

⁴⁶ Applied to all FM projects. See below.

⁴⁷ http://www.sustainabilityprofessionals.org/system/files/Europe%20ecocities_0.pdf, <http://www.cafebabel.co.uk/article/europes-eco-cities.html>

4.1 International Eco-Cities Initiative

The Leverhulme Trust funded an international research network to carry out cross-comparative research on urban sustainability indicators, standards and frameworks.⁴⁸ This initiative responds to the recent growth of various types of eco-cities, resulting in a wide range of urban sustainability indicators, standards and certification schemes. Comparative research aims to clarify the policy perspective regarding eco-cities and sustainable development more generally. The outcome of this research could be relevant for the policy implications of the EU-Asia Dialogue in this field, considering that the study includes 71 European and 25 Chinese eco-cities. It is also relevant as a general methodology underlying transfer of knowledge and know-how, including in commercial mode.

The project has produced the Bellagio Statement in 2012 with conclusions and recommendations on “Tomorrow’s City Today”,⁴⁹ based on the various emerging indicators and accreditation schemes vying for international acceptance. It divides into observations, lessons and recommendations pertaining in particular to individual initiatives and international frameworks.

The research stresses that international frameworks should rest on performance specifications and allow for wide-ranging local adaptation. It is interesting to examine the protagonists of such urban sustainability indicators and frameworks. Besides academic research which aims towards defining sustainability through more quantitative, evidence-based measurements, international agencies are also postulating measurements to rank order eco-cities, while the private sector shows an increased interest in establishing certifications either for fees or open source to include cities in the developing world. All these initiatives can be seen to raise public awareness of the need for sustainable development, as well as aspirations of city leaders and governments. Despite stressing local diversity and acknowledging the existence of decentralised governance, the establishment of indicators, standards and frameworks are a normative pursuit. They may streamline what are currently very diverse experiments to suit ultimately global norms which tend to be dominated by large corporate interests and intergovernmental bodies.

Getting certification to be taken up by cities may well increase the use and value of green technologies in the built environment. However, the examples of “Tomorrow’s City Today” are exclusively green field, new-build ones. Their scale is generally small, mainly at the level of “green” technologies applied to buildings or neighbourhood masterplans and the possibility of up-scaling these measures to city level remain unproven and untested.

By mainly focusing on single objectives, such as energy efficiency and renewable energy generation, water management or recycling and curbing air pollution, they do not fulfil the objectives of sustainability, which is integrative and should encompass environmental, economic and social dimensions equally. The latter is often left aside when seeking economically viable environmental improvements. In urbanised Europe, cities are built and changes are

⁴⁸ <http://www.westminster.ac.uk/ecocities>

⁴⁹ International Eco-Cities Initiative. 2012. Tomorrow’s City Today, Eco-city indicators, standards and frameworks, Bellagio Conference Report. University of Westminster.

marginal, thus retrofitting the existing fabric would have a much greater effect on sustainability than green field developments. It should be kept in mind that even in the developing world, a lot of settlements exist and are unsustainable. Devising sustainability standards for the global level may assist the development industry to transfer and apply “green” technology and management worldwide, which would increase sustainability overall. However, current examples show that this takes place in high-end, new and often gated settlements, possibly displacing communities, while creating an increasing gap between existing built-up areas in need of retrofitting, which is not taking place, and new developments on the outskirts or at a distance of existing cities, which are arguably not sustainable at the macro-scale.

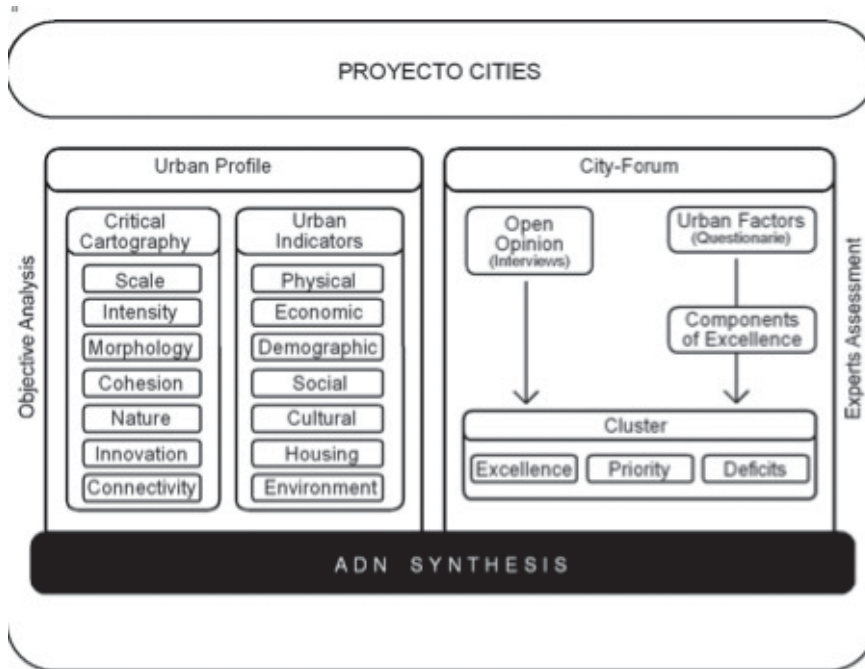
Pertinently, the research also deals with life-cycle aspects. It acknowledges that indicators, standards and frameworks may have to differ for the different stages of the development process or governance systems which, moreover, vary widely between the developed and the developing world. It means that positive pursuit of “standardisation” has to remain dynamic and constantly changing in the light of changing demand and the state of flux of cities. It would be desirable to shift some of these efforts towards retrofitting the existing urban fabric, as its cumulative effects would outweigh widely those of new-built eco-quarters. More thought may have to go into the reasons why retrofitting seems to be so much less attractive for the development industry. Land ownership and extracting surplus value from land may be one of the key obstacles to a more level playing field.

If the pursuit of increasing sustainability is successful in the long term, it may mean that it would become part of mainstream development processes, encompassing urban policies, planning, implementation and maintenance endorsed and supported by the citizens.

4.2 Proyecto Cities methodology

The Fundacion Metropoli (FM) initiated the “Proyecto Cities” methodology in cooperation with the University of Pennsylvania. It was developed with 25 cities worldwide, and has become a key approach in FM’s applied research on sustainable development. Many cities have joined the network and are contributing to the continuous refinement of the methodology, which combines quantitative with qualitative aspects.

Proyecto Cities, participatory analytical methodology. Diagram combining objective analysis (urban profiles) with expert assessments (from city forum) into components of excellence, deficits and priorities, the DNA of a city.



Source: Fundacion Metropoli.

The quantitative “urban profile” includes the international context of the city, together with urban indicators characterising the physical structure, economy, demography, society, culture, housing and environment of the city. The quantitative part encompasses data in the public domain and trend extrapolations to substantiate the urban reality of each city. It resorts to “space syntax”⁵⁰ to analyse connectivity. Critical cartography perfected by the Fundacion Metropoli represents the scale, intensity, morphology, cohesion, nature, innovation and connectivity of the city, with special attention to physical attributes and location of innovative activities. It also spatialises demographic and socio-economic characteristics to visualise distribution, cohesion, inequalities and fragmentation. The diagrammatic nature of these graphics is able to project a synthetic perception of essential urban features, highlighting both assets and constraints.

The interactive City Forum involves up to fifty representative key players of the studied cities. They prioritise and weigh some 180 urban factors by means of questionnaires and structured interviews and they rank order economic, socio-cultural, governance and environmental aspects according to their innovation potential. From these overall inputs, the methodology derives the city’s “components of excellence”. During brainstorming sessions, the city forum identifies the strengths and deficits of the city and extrapolates the city’s synergistic “clusters of excellence”, with the aim of setting priorities to make the city sustainably

⁵⁰ Developed by University College London.

competitive in a globalising world. The methodology identifies the most relevant groups of urban elements and subjects them to a more comprehensively weighted interpretation in the form of matrices and scattergrams, while comparative critical cartography captures mutual relations between the physical form and overall structure of the city, its economic competitiveness, socio-cultural cohesion and environmental sustainability.

The policy implications of this methodology are to identify the city's deficits, establish critical priorities and devise strategic interventions to extract the best possible results of the city's very own "DNA". In this sense, the Proyecto Cities methodology is a practical policy tool which harnesses evidence from the local social and knowledge capital.

5. MUTUAL LEARNING OPPORTUNITIES?

No transferable models or guidelines are proposed here to assist the EU-Asia Dialogue, because they are socially constructed and cannot be neutral nor universal. Instead, this article argues in favour of practice to inspire others who wish to make the world more sustainable. Assisted by experience and principles, practice is drawing continuously on experimentation. This is helped by the elusiveness of sustainability, an aspiration rather than a scientific concept, and a liberating force for creating new designs. Eco-cities are springing up all over the world, in many different forms and with a variety of pursuits. They may just be a step in a much more ambitious undertaking towards less-wasteful lifestyles in built environments, more sustainably in tune with their broader context and future needs.

Eco-valley as a Fundamental Element for Eco-cities

Eero Paloheimo¹

Eero Paloheimo Ecocity Ltd

THE BASIC CHARACTER OF THE CITY

A city is not a machine. It is a living creature. It even has metabolism.

We might think a city consists mainly of buildings, streets, plazas and parks; however, all of these, though important, are merely the city's skeleton. Similar to the body of a living creature, a city functions with myriads of flows, usually known as infrastructures. The discussion will first focus on these flows. They consume energy. They produce waste.

The two most common materials that flow daily into and within the city for sustenance are food and water. The flow of these materials corresponds to that in the bowels of animals, and in both cases the final result is organic waste. Analogous to this flow, the city also produces two other types of material flows. The first type is the flow of inorganic and other industrial materials, which comes into the city as different useful products and usually discharges as inorganic waste. The second type is the internal and external flow of passengers. All flow types together create a flow of materials through the skeleton.

However, the movement of materials as well as different kinds of production and consumption require energy. Thus, the flow of energy corresponds to the blood circulatory system in animals and the photosynthesis process in plants.

Besides a flow of materials and the flow of energy, an additional element, which is not common to plants but essential in all animals, must be considered — the nerves. The electric messages in the nerves of animals correspond to the different information flows within all cities.

Can we convince ourselves a city resembles a living organism simply by these postulations? We have now established an allegory of skeleton, bowels, veins and nerves and — of course — all the different organs taking care of the circulation, treatment and disposal of circulated materials. Will this describe everything? Absolutely not!

In addition to the materials flow perspective, the city also encompasses one more human dimension. City inhabitants are instrumental in shaping the city that feels and thinks. The

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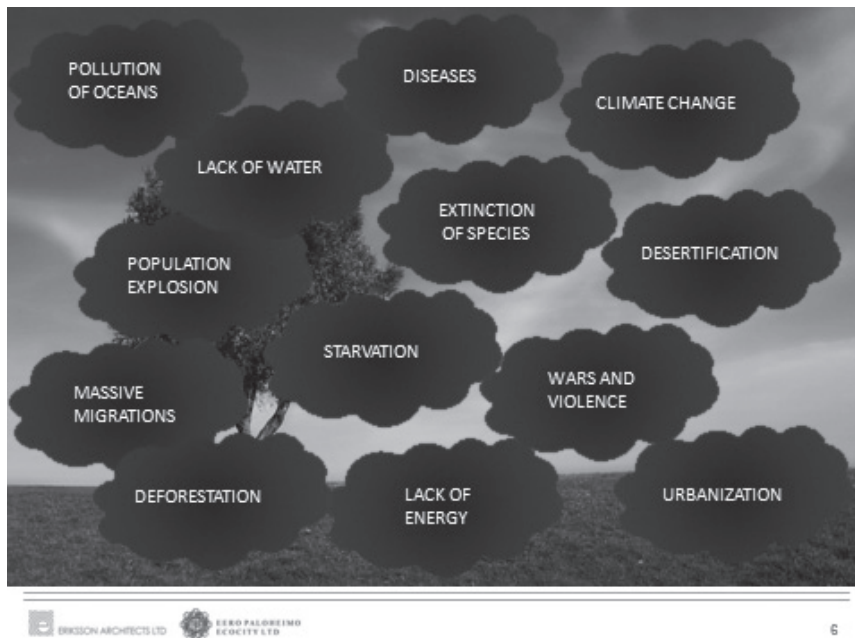
city itself has its memory, and its future plans and goals too, and has undergone the stages of childhood, youth, midlife and old age. The city has its soul, character and personality. In short, it can be regarded as an individual. A machine is not an individual.

It is not enough to claim that the city is a life form as it is actually beyond that. The city possesses the characteristics of an animal, and perhaps even that of a human being. If that is the case, what kind of animal will the city take after? Let us make a comparison between a conventional city and an ideal eco-city.

ECO-CITY AS A PRODUCT

The world is facing a serious environmental crisis. We need a solution to this crisis.

Figure 1: Parts of the Environmental Crisis [1]



Approximately half of the world's population lives in cities. The renewal of cities is therefore an essential part of the panacea needed to solve the gigantic environmental problem and cure its wounds.

There are two mundane requirements of cities — first, the city must not pollute or contaminate its environment, air, water or soil; second, the city must not exploit its environment. It should utilize the natural resources as sparingly as possible. The reality is: no city on this planet today fulfils these requirements. All cities today take after the characteristics of animals, but the conventional cities however resemble animals that we used to call parasites. They are parasites of the planet and nature.

By contrast, an ideal eco-city is not a parasite. Instead, it behaves like a self-sustainable, individual animal. It returns to nature all that it has taken from it. This is related to the concept of self-sustainability of infrastructure but also the buildings, streets and the process of city planning that form the skeleton of the city. In sum, the city should apply and adhere to the two basic rules: no pollution, and no exploitation. This is easy in theory but difficult in practice.

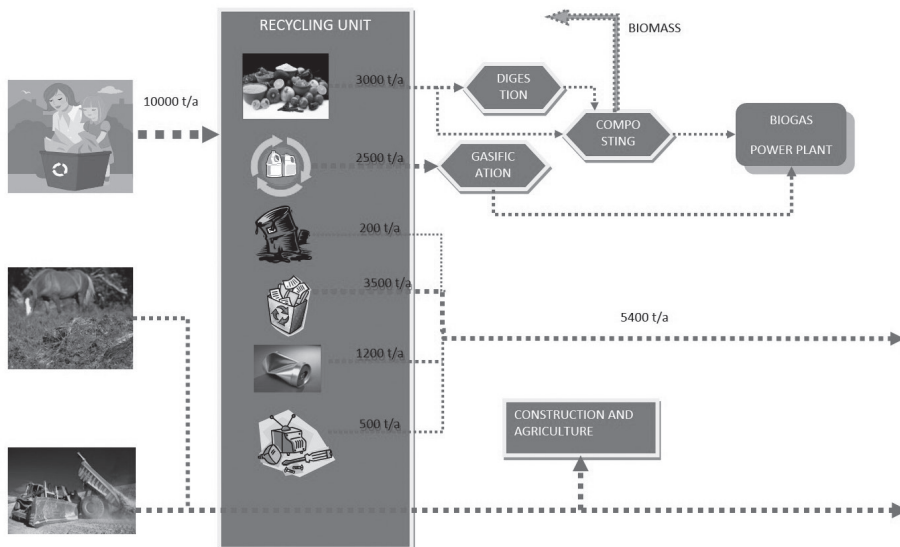
In practice, meeting the requirements implies that virtually all infrastructure as well as the production processes of goods of the conventional cities have to be renewed. These will be examined in the next sections. It should be noted that the study of production/consumption processes includes the compulsory life-cycle analysis and the mutual influence of different industrial sectors.

Food production and consumption

Food should be produced in the neighbourhood of the city to avoid long lines of transportation. The production of food should be integrated with organic waste recycling, bioenergy production and health care. In this consideration, food production should not be examined as a discrete process, but as a complete recycling process of organic nutrients and materials which food also comes from. The outlying suburb areas can be allocated as agricultural land to produce food for urban residents. In the age of information and communication technology (ICT), the necessity of high-density cities may not be as compelling compared to a century ago.

Figure 2: Recycling of Nutrients in an Eco-city [2]

Optimal recycling of nutrients...



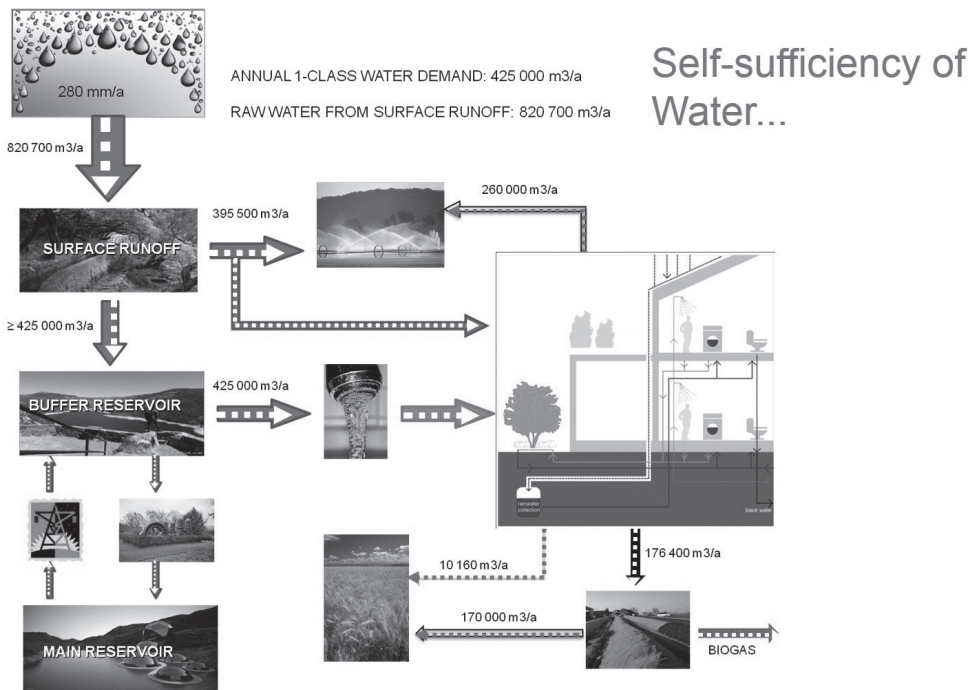
Forestry and recycling of wood products

Forestry, production of paper, timber and other wood products as well as the reuse of paper and wood create the recycling and reuse industry. Forestry is also capable of and can be tapped for bioenergy production, which of course is relevant in regions with forestry and forest industry. However, forestry should be incorporated in the planning of the basic land use of the city. Appropriate forestry practice can play a crucial role also in alleviating air pollution. The forest is in fact a carbon sink.

Water recycling

In affluent societies, the daily water consumption per capita for household use is about 200 litres. Hence, water constitutes by far the main recycled material in any cities. The availability of water resources differs from one region to another. For areas that face challenges of water shortage, the question of a city's survival becomes very relevant and a sustainable solution must be sought. Water desalination has been made economically possible now by graphene nanotechnology. The division into two different water systems and the use of so-called grey water for secondary purposes is an alternative. More importantly, the recycling of grey water, which is used for industry, agriculture and the like, is absolutely necessary. Grey water is however not recommended for drinking and cooking. Experience has indicated that only water that has passed freezing or evaporation point is of drinking quality.

Figure 3: Self-sufficiency of Water in an Eco-city [2]



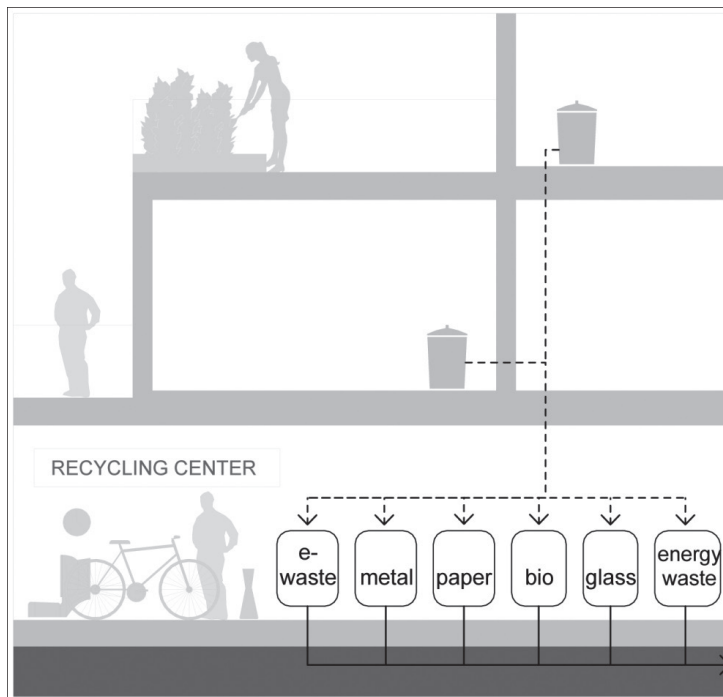
It should be noted that the water cycle process in mountainous areas has an additional economic value as a major source of power generation and power storage. In many areas, the

availability of rain and sunshine is limited to certain times of the year. As a result, there are periods of overproduction of power and also periods of low production of natural clean energy. Then, there exists the critical problem of power storage. In times of overproduction, this can be solved by utilising energy to pump water uphill in mountainous areas; whereas during underproduction periods, stored energy can be consumed by using conventional hydropower.

Organic materials recycling

In the planning of eco-cities, various dimensions such as agriculture, waste treatment, water re-usage, bioenergy, energy storage and constructing green buildings using wood should be considered as an integrated entity. As recycling technology requires professional and specialised expertise, this aspect towards sustainable development is usually neglected. This should not be the case in eco-city planning.

Figure 4: Separation of Waste in an Eco-city [2]



Planners should observe two fundamental aspects of eco-cities. First, every eco-city is uniquely different, characterised by its dependency on the natural requirements and the possibilities of the specific region. Therefore, the issues of water shortage, and the possibilities to introduce forestry and energy storage are distinctive to every individual eco-city. Eco-cities are results of individualised planning and thus not clones of each other.

The second important aspect in eco-city planning is incorporating and linking the material and energy flows of a community into a closed loop system, and it should not be merely the study and design of production and consumption as specialised sectors. The closed loop system consists of at least three flow loops, i.e., organic material recycling, water recycling

and energy renewal. The ICT can be utilised to efficiently examine the linkages of these closed loop systems.

Inorganic material recycling loop

The author discusses recycling in this article, rather than focus on industry and production *per se*, which nevertheless form essential components in the recycling process.

In a modern community, many products are manufactured from inorganic materials. The chief difference between recycling loops of inorganic materials and organic materials is that recycling of inorganic materials is not on a daily basis and it is also much slower. There are nevertheless differences for various types of inorganic materials, e.g., the recycling loop of building materials is much slower than that of computers.

There are three common facts about recycling of inorganic materials. First, metal recycling is an easier and cleaner process than the recycling of polymers, concrete and ceramics. Second, most products contain different types of inorganic materials. Third, producing new material from recycled resources requires a shorter cycle and a simpler process compared to changing the atomic structure or transforming the chemical properties of a substance.

Figure5: Metals as the Simplest Recycling of Inorganics [3]



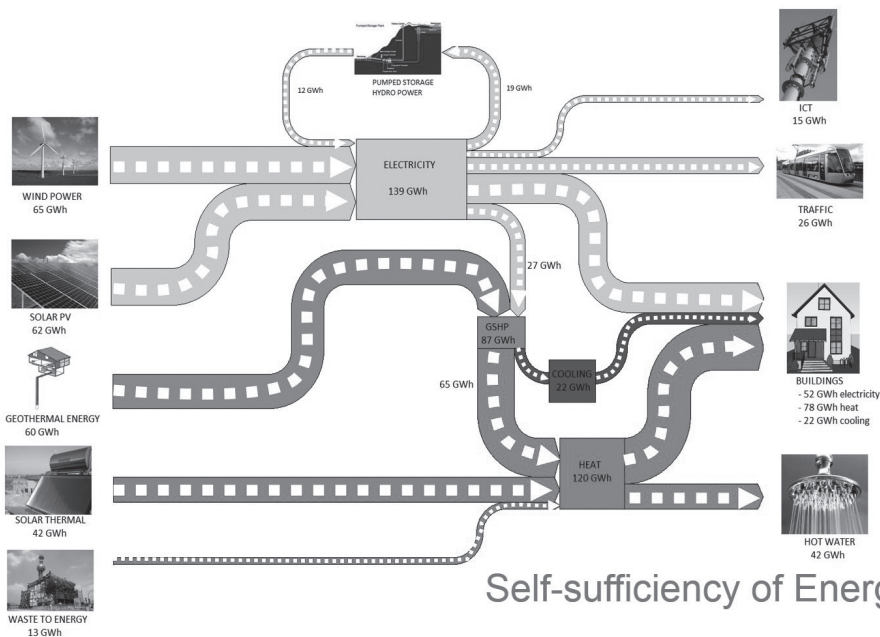
There are differences between organic and inorganic material recycling in a geographic context. Organic material recycling is a simpler process at the community level; inorganic material recycling however takes on a larger scale and has to be strategically implemented at a national level. An ideal model would be international in scope, in which case, an international audit of the material flows would be useful. This would, of course, need a political agreement.

Energy self-sufficiency

All recycling loops and material flows need energy. This explains why the design and analysis of energy production and consumption should be integrated with material loops and not considered separately.

The world has no proper energy strategy — yet. In the long run, energy sources must be utilized by sustainable methods; most notably, the sun is the basic source. There are different applications of solar-based energy: photovoltaic modules, solar thermal energy, wind turbines, geothermal energy and bioenergy. However, the study of these applications should not concentrate merely on the use of the equipment; instead the entire life-cycles of the systems should be analysed with focus on the material lifespan of the equipment and not solely the economic costs involved. The materials used should be recyclable to give material waste renewed life by a “cradle-to-cradle” approach. The recycling loop is relevant and different alternatives should be closely examined and compared for the most economical option.

Figure 6: Self-Sufficiency of Energy in an Eco-city [2]



A simultaneous comparison of the various production possibilities is essential for exploring different energy-saving applications. The optimal result is not the same in all cases, but depends on the climate and a city’s comparative advantage in resources and geographical conditions. Even in this respect, eco-cities are individually unique and have individual needs and considerations.

Traffic management

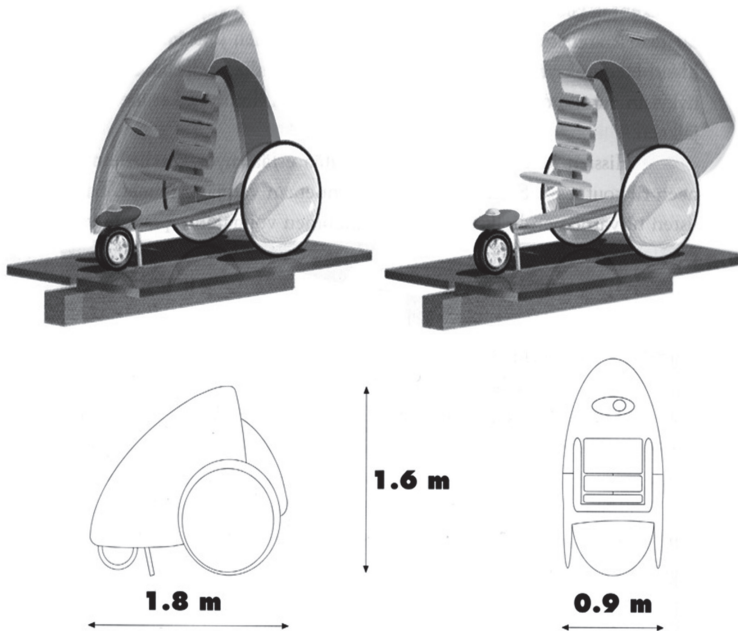
Today, polluting, fuel-powered cars dictate land use and design in urban planning. Cars pollute the air of cities, occupy vast areas of parking places and even command the land use.

Large cities consist of special residential areas, business centres, industrial areas and administrative districts. As facilities and amenities become more centralised, people spend more time commuting. Smaller shops — being replaced by larger shopping malls — gradually vanish. The social disconnect in city planning is the result of making provisions blindly for fuel-powered, privately owned passenger cars.

Fuel-powered cars are not an ideal mode of transportation in eco-cities. As early as 20 years ago, a different kind of traffic system would have been possible in the form of small, electric vehicles with central navigation systems that operate by automatic rechargeable batteries and are available through rental. These vehicles will operate like ultra-cheap but driverless taxis. We are gradually moving towards this new form of traffic system, albeit too slowly.

Figure 7: Vehicle Presented for General Use in 1995 [3]

Passanger Car for one person



Electric buses are also a possible alternative, already adapted in some cities. However, electric buses do not offer the same flexibility and convenience as the small, clean and safe automatic electric cars.

Buildings and streets

Buildings and streets form the skeleton of an eco-city. Being permanent and stationary, buildings and streets do not pollute or put a strain on natural resources. They do, however, cause materials flow and movement during the construction stage and subsequent repair and maintenance. Energy flow also constitutes a type of movement when streets are lit and buildings are being cooled or heated. Studying the indirect influences of materials flow and movement

on the environment, it has also been found that heating or cooling of buildings has usually the greatest impact.

It is usual that certain basic principles and standard practices are not taken into consideration in conventional construction. One of these considerations is that local materials should be used for construction. Also, when designing a building, specify the intended lifespan for occupancy. The flexibility in the functions of a building is also a key factor. The life-cycle analysis of energy consumption should be given due attention.

Streets function not only as traffic routes but maybe also as an energy source — the asphalt road surface can absorb the sun's heat effectively. Harnessing energy from streets — that would probably bring radical engineering changes in vehicles in the near future — is possible and even tempting. This would also bring revolutionary changes to vehicle parking provision and design.

Land use

Land use planning involves multi-layered decision-making, which then lays out the entire skeletal frame of the city. In eco-cities, land is designated in zones for different purposes: protected nature reserves, commercial forest, agricultural land, courtyards and gardens, parks and recreational areas as well as built-up urban areas and plazas. An ideal eco-city should contain a mixed array of types of spaces to meet the needs of residents, with accessibility to work, education, shopping and entertainment within close proximity of their homes.

Today's cities are however the antithesis of eco-cities. Centralised areas with equal functions that are located at large distances apart are in fact unnecessary today. Such urban planning of course benefits and supports the automobile industry but it is not people-centric.

Before tearing down outdated buildings in old cities, the first question urban planners should always ask is: should the space be replaced with new buildings or possibly be planned as a park, forest or even agricultural land?

ICT

In modern communities, all materials flow and movement are electronically controlled by computers. ICT is essential in every modern system comprising different networks of machines and subsystems.

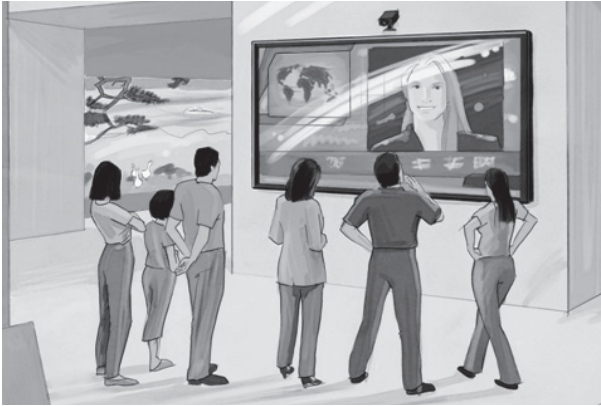
ICT is commonly associated with digital transmission of information and person-to-person communication via mobile phones, the Internet, and the TV media, etc. ICT also has important application in modern eco-cities, connecting various recycling loops electronically.

Though the definition of ICT is well established, the author prefers to explore further by studying it as an allegory to the human brain. Our human mind consists of two parts: the conscious and the subconscious. To explain simply, the conscious side of our mind is associated with doing and processing information, whereas the subconscious side is associated with acting upon something without the use of willpower or intent. It is known that the subconscious side of our mind plays a bigger and more important role than the conscious side.

The communication — e.g., the action of sending messages — between persons and groups via networks and the Internet constitutes the conscious function of the eco-city.

However, the subconscious side predominates over the conscious side. It controls the entire hidden loop network: the energy flow, materials flow, information and communication networks, the consumption and recycling of energy and materials, as well as the plants, infrastructure and institutions that keep the machinery of the eco-city running.

Figure 8: ICT has its Conscious and Subconscious Parts [4]



Two Basic Types of Eco-Cities

There are very few well-known examples of cities in the world that have been planned for or built on totally undeveloped, virgin land. Brasilia in Brazil is a famous example that was built from scratch. Projects that involve the building of completely new districts as parts of former cities are, however, more common than projects that involve developing an entire city.

Binhai in Tianjin and Masdar in Abu Dhabi are new eco-cities that are planned and constructed without any pre-existing infrastructure and simultaneously according to some fundamental requirements of eco-cities. The crucial question is: do we respond to the basic challenge with these new eco-cities? The answer is: “That is not enough”.

Eco-cities should serve as exemplary cities for new areas that are being developed worldwide. We should simultaneously reflect upon the built environment — past and present. We should also then think about the severity of pollution in the atmosphere, ocean and soil, extensive deforestation, endangered species, loss of agricultural land and exploitation of natural resources. Will developing new cities or eco-cities bring serious impact on the environment in reality?

Of course, building eco-cities is absolutely necessary now and in the future, but that alone is not enough. The greater challenge is to renew old cities to the standards and requirements of new, ideal eco-cities. How this could happen will be discussed as follows.

Cities like Rome, New York, Bombay, Baghdad and Tokyo have histories that date back many centuries. Being old cities, it is absolutely impossible to destroy or even change their appearance and architectural value. This is however not even necessary. In fact, we have wide experiences in the renewal of cities. The mode of transportation in the past was horse-driven carriages, which were replaced by cars. Buildings in the past were constructed of timber, bricks and stone, whereas buildings today are concrete and steel structures. In the olden days, candles were our source of lighting and wells our source of water; in today’s modern world,

we have electricity supply, water supply and drainage systems. The new challenges for the future world concern also the already existing cities. The greater focus is to renew old cities rather than to build new eco-cities, because the existing cities constitute the majority of our urban environment.

To effectuate changes, only the infrastructures need to be renewed, not the buildings or streets. The skeleton should remain. Electric power plants and other power generation plants using alternative energy take up large areas but must be constructed. They can be built outside the city. More green areas need to be incorporated. Green spaces can be created from land vacated by demolished disused buildings. New vehicles on the streets need less room than the conventional cars. Therefore all streets and the basic cityscape can remain. Similarly, buildings can go green by installing thermal insulation without any changes made to the building façade and appearance. So, transforming existing cities to sustainable green cities is a gargantuan but not impossible task. It can be considered to be of a much smaller scale in comparison, for example, with the restoration of many cities after the Second World War.

At any rate, this renewal project should be realised worldwide in the imminent decades. There is certainly no time to waste and delay the project, for example, till the next century. This implies also that new technology should be developed and incorporated as one of the main teaching programmes in all technological universities. New technology will naturally lead to thousands of new industries, such as production of energy-efficient automobiles, wind generators, and innovative and economical solar panels, etc. Investments and innovation are driven by the market, which is in turn influenced by international political decisions.

ECO-CITIES AS INDIVIDUALS

Eco-cities are intelligent and self-sustainable, resembling animals in many ways. They are each uniquely different, and should thus be regarded as individuals.

Geographical conditions — such as climate, soil fertility, topography, natural building materials and other factors — vary region from region. Hence, every eco-city has its own distinctive strengths and weaknesses indigenous to its location. Water shortage may be a severe problem in some regions, whilst other regions may face challenges in achieving energy self-sufficiency. In fact, obstacles that are inherent in the region present themselves as new possibilities or opportunities rather than as a burden at the planning stage. Therefore, monotony can naturally be avoided because each city has its unique characteristics and should not be reproduced in multiplicity.

In contrast, an eco-city will also have a memory, its history, its own background and heritage founded on different cultures. This diversity, in terms of architecture that is an amalgamation of the East and the West — different religions, various traditions and values — represents richness and does not pose a problem. This does not negate the fact that all eco-cities are in an important way similar to each other and at the same time different from all conventional cities.

We are also reminded of the reality that the variety of eco-cities is determined by the amount of money being invested. In the same vein as consumer products like automobiles,

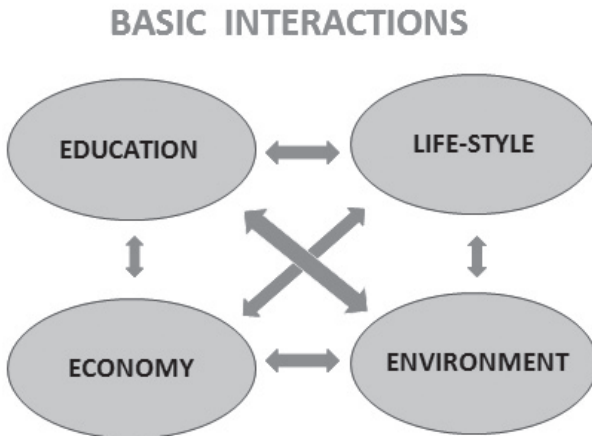
mobile phones or daily necessities range from the economical to expensive categories, eco-cities of the future will also be differentiated by the investment amount — cheap or expensive — and by scale — small or large-sized.

The economy of eco-cities is not necessarily an issue. Poor rural areas in less-developed countries fit more closely to the ideals of eco-cities compared to the large metropolises of wealthy countries today. The author makes a heretical remark that he does not think that people living in large, affluent, modern metropolises are necessarily happier than those living in smaller and more modest places. It is deeply an issue of values, which change constantly today and in the future. And let us remember: the physical and spiritual environments are mutually dependent.

ECO-CITIES AS SPIRITUAL CENTRES

The aforementioned views touch on the material aspects. All kinds of metabolism, including the subconscious network of the eco-city infrastructure, fall entirely under the material category. There is, however, a deeper goal related to the conscious, informative network of the eco-city. The material environment functions as a tool to create more important things. Like a human, an eco-city also embraces the goals and ideas of an ideal future. Beyond that, the goals of various eco-cities may differ but certain characteristics may appear to be common to all eco-cities.

Figure 9: Mutual Influence of Material and Spiritual Dimensions [1]



Nature and Built Environment

Ethics are broadly referred to as intrinsic values and instrumental values. The material dimension discussed above is primarily recognised as an instrumental value that explains the underlying context and the understanding of happiness. Then the question to probe is what defines the intrinsic ethical value of an eco-city.

The concept of eco-cities is founded on the concern for the future of our planet earth. It is not only for the destiny of mankind, but also for the survival of the rich biodiversity of this

planet. Every single life on earth has its intrinsic value and this justifies the rationale of building eco-cities. However, marrying nature and humanity harmoniously in eco-cities should be a goal in itself towards attaining the spiritual dimension.

Economy

No cities today can live solely on the basis of ideology, not even eco-cities. It is unrealistic to think that a modern region could be self-sustainable without its neighbouring cities or countries. Like any independent state, eco-cities need to trade both in import and export. An eco-city can engage in production if a thorough evaluation of the type and location of industry is conducted.

Moving production subterranean will be a probable solution to industries that cause noise and other pollutions, as modern automation enables production and operation to be controlled by ICT from an office above the ground level. There is no physical restriction to the type of production and trade, whether import or export, that an eco-city can engage in. In addition, substantial precedent or support from other regions should not be required in deciding to build an eco-city. Moreover, each eco-city will be unique and almost independent.

Everyday Life

Exalting what daily life in an eco-city should be may be too bold a statement to make and that would violate the individual freedom of the city's inhabitants. Living in eco-cities does not necessarily mean the need to embrace a totally new kind of religion or morality.

We can make enlightened and educated guesses instead. A city that integrates nature into its physical environment brings new vibes. Introducing more pedestrianized streets in urban areas that are also bicycle-friendly and building offices, schools and shopping amenities in the proximity of residential areas within walking distance will reduce noise and air pollution from cars and change the streetscape. Pedestrian streets in many cities today will give a hint and glimpse of what a pedestrianized city would look like. The clean air and reduced noise pollution from motor vehicles will certainly make a difference to the quality of living in cities.

Living in proximity to work has offered the flexibility and freedom of having various work-leisure time combinations, as well as the possibilities of working from different locations. Last but not least, enjoying sufficient wealth in a conducive, natural environment reflects the sound strategy of work-life balance.

Education

Changes to cities are necessary and that constitutes a new industrial revolution. In today's context, to bring about changes will require knowledge beyond professional expertise, and in fact, it requires a new attitude and new skills of engineers and architects. This thus leads to a revamp of teaching programmes and curricula in technological universities.

In essence, a profound technological change without gaining society's acceptance is tantamount to an alien visitor in a society. Therefore, technological changes should result in a transformation in education goals, from kindergartens to universities. This is a hard truth, and notably, such changes are already going on in many countries.

ECO-VALLEY: ESSENTIAL BASIS OF ECO-CITIES

Silicon Valley in California is an exemplary model of the successful centralisation of clusters of new ideas and technology. Such similar centralisation is necessary for clean technology too. A major difference for clean technology is that it involves a much larger combination of different components other than information technology. It also has deeper and more extensive influence on people's life than information technology, because any technological advance in ICT is only a subset of that of clean technology.

Figure 10: Mutual Influence of Different Technological Sectors [1]

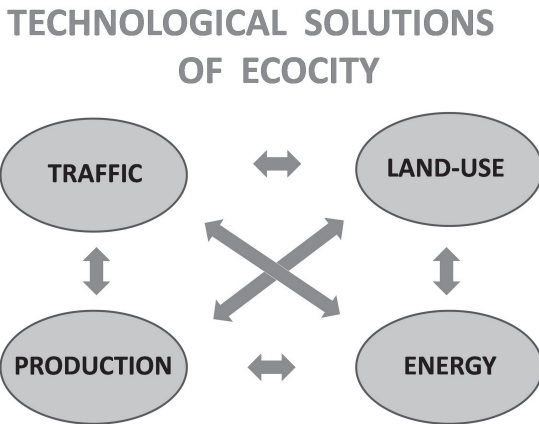
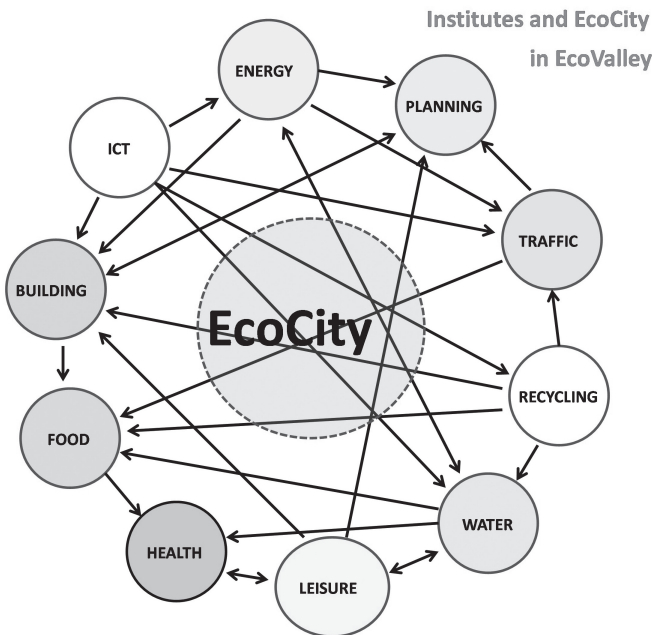


Figure 11: Eco-valley Combines Science and Lifestyle [1]



In fact, the earth needs many more eco-valleys.

With this concept in mind, the author proposes a radical, but not very large-scale eco-city combined with several such institutes, which would study the different sectors of clean technology, such as recycling, food production, water management, traffic, clean energy, waste treatment, ICT, urban planning, health care, construction, new architectural features, environmental arts and various social issues. This combination can be called an eco-valley. It produces three types of synergy, namely synergy between different technologies, synergy between theory and practice, and synergy between different cultures.

Synergy between Different Technologies

It is understandable that making the switch from petrol-powered motor-cars to electric cars does not prove to be advantageous if the electricity is generated by a power plant that burns coal. Most technology sectors are mutually dependent on each other and rarely can one find any sector that is completely independent. One can try!

For example, environmental arts can adopt new water management as a theme to portray water issues in a series of works of arts in urban environment. That every sector is dependent on many other sectors explains why eco-valleys are needed in the near future. Developing technological sectors independently is a mistake and simultaneously a waste of time and resources, and should therefore be avoided.

Synergy between Theory and Practice

We can produce plans of eco-cities, develop different clean technologies, solve scientific problems and invent innovations. However, the objective of eco-city planning is also to have a consultation with people to understand their needs, their wishes, their feedback and their criticism about living in eco-cities.

That an eco-valley is made up of a cluster of institutes that focus on making new innovations to improve people's life with sovereignty is a misconception. In fact, the inhabitants of eco-cities are experts, contributing their observations and investigations, and they are, in many ways, playing the role of teachers to the scientists working in the institutes of an eco-valley.

Therefore, a real-life simulation laboratory is needed for the entity so that inhabitants can provide immediate feedback on the usage of prototypes of various innovations, including all clean technology sectors such as traffic management, waste treatment, energy consumption, etc. The synergy between theory and practice is important; otherwise, the goals and results of any studies may end up fundamentally misleading.

Synergy between Different Cultures

An eco-valley may be located amidst a specific world culture, but its basic innovative results should be applicable to the whole world. It should be understood that systems or the components within products may be internationally adaptable and applicable but the final result — that is, the eco-city — will be essentially different in Africa, America, Europe, India,

Arabic countries, etc. Cultural differences should be respected at the outset. Of course, some influences and plagiarism — which have happened historically — are unavoidable.

Serious mistakes can be prevented by attracting people from multicultural backgrounds to join the institutes at the very beginning. The ethnic and cultural diversity will help enhance understanding and awareness of various cultural sensitivities and treat other people's beliefs with respect and compassion. Thus incorporating diversity in institutes is fruitful. An example is how traditional Chinese medicine is incorporated into Western medicine in medical treatments for complementary effects.

Mentougou — An Example of an Eco-valley

In the whole world, there is no realised example of an eco-valley, but there is at least one proposal for such a project. That is a combination of 10 institutes and a city for 20,000 people. In 2010-2011, a project was created by Eero Paloheimo EcoCity Ltd with the assistance of Eriksson Architects Ltd, to design and build an eco-valley in Mentougou, a town which is located about 50 kilometres from Beijing, China. The plans and designs are currently ready for implementation and realisation.

Figure 12: The Area of MenTouGou Eco-valley [2]

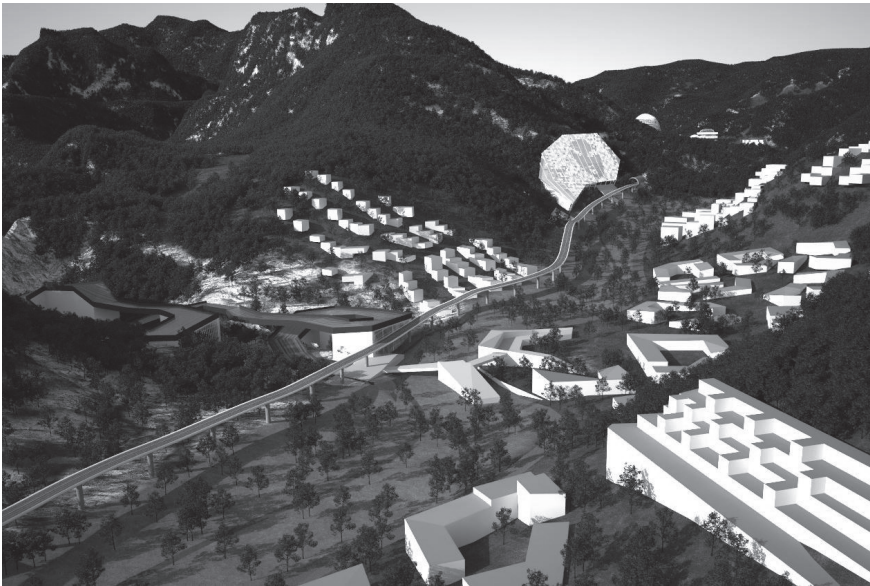
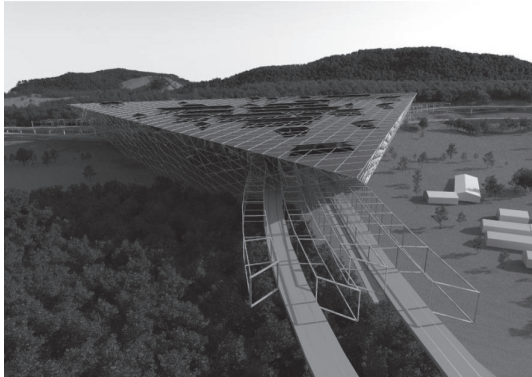
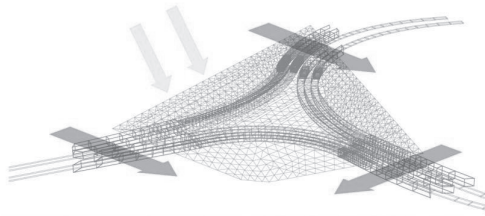


Figure 13: Traffic Institute [2]

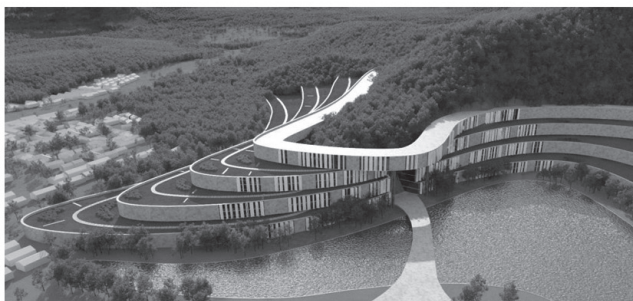
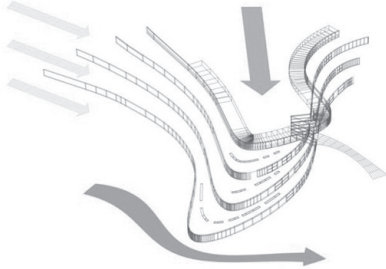


TRAFFIC INSTITUTE

- Maglev train- and electric tram-stations lifted up from the ground covered by a large roof construction
- Photovoltaic panels on the glass roof producing energy



Figure 14: Food Institute [2]



ECO-FOOD INSTITUTE

- Green roof planting terraces and water for research
- Institute located on the top and green terraces following the existing slope
- Flexible double high laboratories
- Sun- and wind-shading on the facades

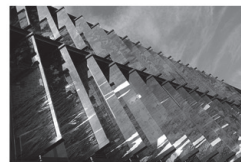
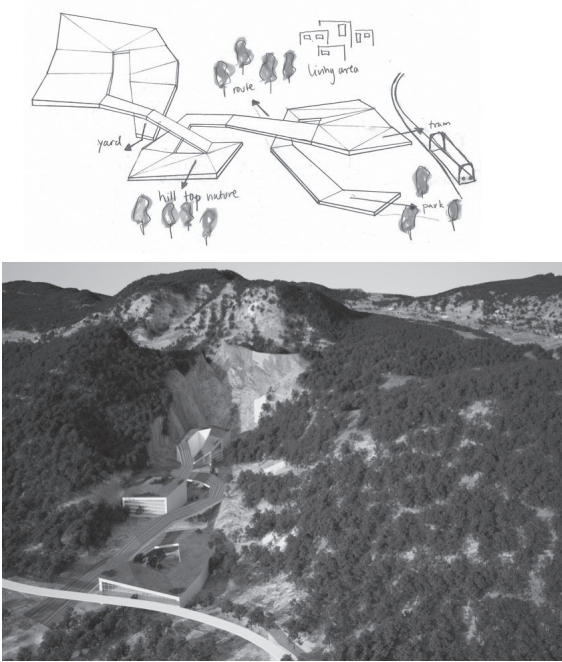


Figure 15: Recycling Institute [2]



RECYCLING INSTITUTE

- Three buildings connected by a roof construction
- All buildings made from locally recycled materials
- Roof garden as a path connecting the green corridor with mountain nature

Figure 16: ICT Institute [2]



ICT INSTITUTE

- The ICT Institute with its large media facade based on the newest technologies, is an information landmark of the area
- The group of courtyards, designed both in the building and in the park, makes the Institute a very important public space of the eco-valley, where the newest achievements of technology meets with people
- Thanks to the careful and sustainable way of design, the building becomes a piece of the environment elevated from the nature

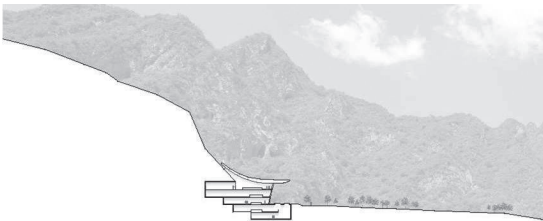
Figure 17: Construction Institute [2]



CONSTRUCTION INSTITUTE

- Building is an expression of traditional construction materials together with modern structure
- Main volumes constructed using local stone from adjacent quarry
- Combined Steel lattice structure and outer skin provide energy efficient building envelope
- Climate control from the thermal mass properties of the stone walls
- Compact building volume of the tower and courtyard allow maximum daylight in all spaces

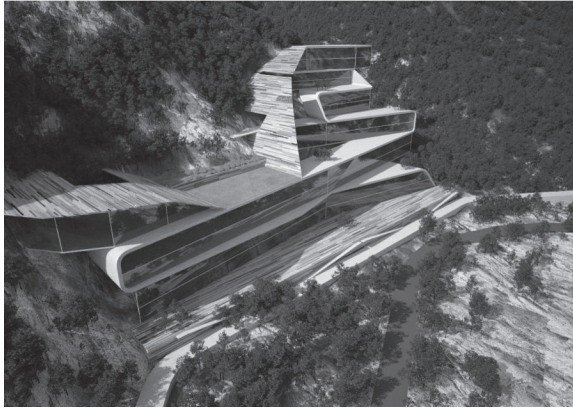
Figure 18: Energy Institute [2]



ENERGY INSTITUTE

- The shape and orientation of the building is designed to generate energy through the use of wind and solar power
- Main volumes are built inside the hill to utilize thermal properties of the earth
- Glass facade and skylights provide daylight to all spaces

Figure 19: Healthcare Institute [2]



HEALTHCARE INSTITUTE

- Health = wellness
- combines hospital and spa
- Colorful, warm, light spaces
- common green spaces and herbal plantation on the wooden decks and facades



Figure 20: Tourism & Leisure Institute [2]



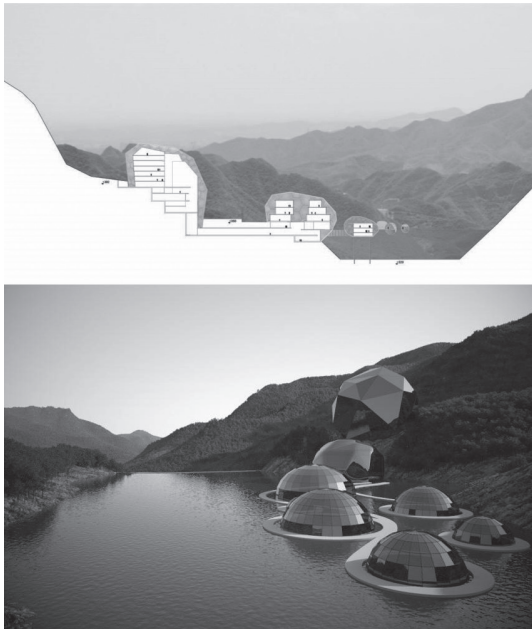
TOURISM & LEISURE INSTITUTE

- 2 bridges on the 2 mountain gorges
- eco hotel and science centre
- half transparent double facade
- starting points for eco activities in the mountain and beyond the valley



- culture house – public open building in the leisure park
- green park roof with tram station
- exhibitions & happenings with culture and ecology as a theme

Figure 21: Water Institute [2]



WATER INSTITUTE

- Building shapes remind of ice melting to water
- The glass constructions regulate the climate ecologically over the seasons
- Institute as community water activity center

Eco-valley as a Fundament

Eco-cities are analogous to consumer products created by factories. This makes eco-valleys an essential part of the production process, while they provide essential information to world-wide eco-city builders. Eco-cities are at the same time regarded as individuals, whereby they build a new family with a common goal. This is to ensure the survival and sustainability of our planet. Hence, there is a pressing need also for eco-valleys to fulfil the role of factories necessary for attaining this goal. The world needs this very soon.

References:

- [1] Illustrations drawn by the author, presented earlier in many seminars and conferences in different countries.
- [2] Illustrations presented earlier in the report of Eco-Valley, MenTouGou, 2011.
- [3] Illustrations presented earlier in the book “Future of Europe”(Eero Paloheimo)1996.
- [4] Illustration presented earlier by the author e.g. in Tianjin conference “The Finnish EcoCity for the Future in China” 2007.

Why There is No German “Masdar City” – Environmental and Ecological Aspects in Germany’s Urban Development

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1. INTRODUCTION

In many Asian countries, “eco cities” are on the agenda: planned cities that are eco-friendly, self-sufficient and aiming at zero emission – Masdar city being the most prominent example. A visitor to Germany, however, will not find similar activities related to large-scale “greenfield” eco-cities. Instead she will come across many different examples of how ecology is included in urban development that are on a smaller scale and mostly related to the transformation of the existing urban fabric: sustainable buildings, energetic modernization of districts, community gardens or derelict land converted into green urban landscapes.

The overall issue of urban development in Germany is not about how to accommodate growth but how to transform given urban structures in the light of demographic shifts, economic and technological change, roll-out of sustainable energy and adaptation to climate change. Ecological aspects – like reducing greenhouse gas or noise emissions, landscape conservation, protecting open space or safeguarding biodiversity – are relevant aspects in urban development. But they are more and more incorporated within integrative strategies for sustainable development that also consider social and economic aspects.

This article describes which role ecology and environmental issues play in Germany’s urban development and how they are reflected in its legal framework and policy programmes. It starts with a description of past and present challenges of urban planning and the role of the local level within environmental policy implementation. It then gives an outline of important fields of action – sustainable land use, green infrastructure, mitigation of climate change, and mobility – and describes the policy instruments in place and how they are implemented in exemplary urban projects. A special focus is given to integrative approaches that focus on a combination of environmental, economic and social aspects. The conclusion identifies some lessons learnt for incorporating environmental issues in urban development in better ways.

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2. URBAN DEVELOPMENT IN GERMANY

Phases of urban development

Challenges in German urban development have changed over time. Immediately after WWII, rebuilding of inner cities and the provision of new housing, predominantly within city borders, to combat housing shortage were the main activities. This period was followed by rapid suburbanization of population and jobs along with massive investments in transportation infrastructure starting in the 1960s. At the end of this decade, urban renewal started – first conceptualized as a complete demolition and replacement of built structures that were seen as outdated. A federal legislation for urban renewal, the *Städtebauförderungsgesetz*, provided German cities with an appropriate legal framework and financial means. In the late 1970s, grassroots movements and controversial political debates about urban renewal resulted in approaches for “cautious” urban renewal (*behaltsame Stadtsanierung*) that sought to repair and restore the built fabric and to engage residents in the renewal process. The first initiatives for ecologically oriented urban renewal started as bottom-up initiatives. Examples are the modernization of Wilhelminian-style tenement houses by cooperatives of former squatters during the International Building Exhibition (IBA) Berlin in the 1980s. These projects included environmentally friendly building materials, green courtyards, solar energy and intelligent water management (e.g., Modellvorhaben Block 103) (BMVBS 2011).

Today there are various federal programmes to support urban renewal in Germany’s cities and towns. Specialized programmes focus on the conservation of built heritage (*Städtebaulicher Denkmalschutz*), the transformation and upgrading of areas in demographic change (*Stadtumbau Ost* and *Stadtumbau West*) and the development of disadvantaged neighbourhoods (*Soziale Stadt*).

In the last fifty years or so once compact cities have developed into polycentric urban landscapes without clear spatial boundaries (Siedentop 2008). But there is a turning point in the spatial development in many city regions today. In many large cities suburbanization and population loss have come to an end and de-urbanization, the population gain of peripheral regions, has stopped (Siedentop 2008). This is not only true for a number of large cities (Hamburg, Munich) but also for a number of medium-sized cities such as Heidelberg or Karlsruhe (Jekel et al. 2010). This trend opens up new opportunities to limit land consumption in the urban periphery. On the other hand, it must be stated that reurbanization can lead to conflicts with urban ecology if vacant inner city land is built upon.

Present challenges of urban development

Today, urban development in Germany has to meet various challenges:

- *Demographic Change:* Germany faces profound demographic changes that will continue in the future – its population will be “less, older and more heterogeneous”. The present effects of demographic change differ considerably between and within German regions. In the former East Germany, in particular, the population has already declined drastically due to declining birth rates and massive outmigration

(BBSR 2012). Some cities have lost one-third of their population and more since 1990, with dramatic consequences for adaptation regarding housing, technical and social infrastructures etc. In economically prosperous regions like Munich or Hamburg, the population will still continue to grow due to national and international immigration. Germany’s population is expected to shrink from about 82 million to 65 to 70 million in the next 50 years due to a larger birth deficit. At the same time, the number of elderly people will grow: in 2060, 14 per cent will be over 80 years old compared to 5 per cent in 2008. Drastically changing ratios of old and young people calls for an adaptation of social infrastructure – a consolidation of kindergarten and schools and an expansion of nursing homes or assisted living. Finally an expected migration balance of 100,000 to 200,000 people will contribute to a more diverse society and the need to develop policies and services to ensure integration and inclusion of immigrants and socio-spatial cohesion (Statistisches Bundesamt 2009).

- *Post-oil city and mitigation of climate change:* The federal government has formulated ambitious goals for Germany’s energy policy for the next decades. They contain commitments to cut energy consumption by 50 per cent, increase the share of renewable energies for power and heating by 50 per cent, and reduce CO₂-emissions by 80 per cent by 2050 (based on 1990 values). Buildings are expected to be climate neutral by 2050, totally dependable on renewable energies. In addition to that, nuclear power will be abolished by 2022. Urban life is responsible for a large part of greenhouse gas emissions: energy consumption of buildings, businesses and industry and urban mobility. The necessary roll-out of renewable energies requires a complete transformation of Germany’s energy system. It calls for urban planning and development to play an important role for their accomplishment (Libbe 2012). This means the energy demand of buildings (e.g., energetic standards for new buildings and energetic renewal) is reduced, regenerative energies (e.g., solar energy, biomass, geothermal energy) are widely used and sustainable urban transport (public transport, cycling, walking) is enforced.
- *Climate change:* For Germany, climate change will have far-reaching consequences for nature and society – despite all current measures contributing to reducing greenhouse gas emissions. Examples are heat-waves in cities due to inadequate fresh air circulation with detrimental effects for its residents, dry rivers, and a higher energy demand because of air conditioning as well as flooding due to heavy rain and damages. Urban planning is called upon to analyse the specific local impacts of climate change, to develop adequate strategies to manage foreseeable consequences and to implement preventive measures (e.g., green space or corridors, retention of rain water, flood control measures etc.) (BMU 2009).
- *Economic and technological change:* Germany is on its way to becoming a service and knowledge-oriented economy. Its industrial core will remain an important source of value creation, especially in combination with industrial services, but new concepts in production and logistics are being established (BDI 2011). Knowledge-intensive companies have other location factors, e.g., spatial proximity to suppliers, research institutions or major clients. This calls for new urban qualities in commercial real estate and a broader variety of specific real estate products – science and business

parks, creative hubs, logistic centres etc. (Zwicker-Schwarm 2013). In the eastern parts of Germany there is still a large amount of industrial brownfields that have to be redeveloped or recultivated.

Environmental policy at local level

Due to the tradition of local self-administration, which is also guaranteed in the constitution (*Grundgesetz*), Germany's municipalities have traditionally a strong position within the federal state. There are two important features: the first feature is the "general competence" of municipalities that empowers local government to deal with all matters of relevance for the local community in their own responsibility (within the frame of law) – e.g., urban planning or the provision of local infrastructure. The second feature is the function of local governments to perform "delegated" tasks by the federal state (Wollmann 2004). As environmental problems like air pollution, noise, solid waste and waste water, contamination of soil or urban sprawl are relevant for the quality of life, municipalities have a responsibility for environmental protection and to consider these issues in spatial or environmental planning. At the same time they execute many European regulations or federal and state laws that concern environmental issues (Hucke 1998).

Environmental issues and the impact of environmental problems on human health and the quality of live have played an important role in the development of strategies for urban development and urban renewal in Germany. Environmental concerns, like the pollution caused by car traffic, were important in urban renewal in the 1970s. In the 1980s environmental concerns gained prominence in Germany's urban planning. Departments of environmental protection were established at the local level. Cities started to provide information and communication activities to support citizens and businesses to include environmental issues in their individual behaviour (e.g., recycling of paper, glass or biomass, energy saving and efficiency in private households and businesses, use of bicycles or public transportation).

Since the EU received competencies in the field of environmental protection in 1992, the European influence on environmental legislation on planning practice and policy development in Germany's municipalities has increased drastically. To name a few keywords: procedures for environmental impact assessment, air quality targets, obligations regarding protected areas (*Flora-Fauna-Habitat Gebiete*) and compulsory energetic standards for buildings.

Ecology as part of sustainable development

During the 1990s, environmental aspects became more and more integrated in the concept of sustainability and local Agenda 21 processes. Following the Rio Declaration on Environment and Development (1992) and the Aalborg Charter on Sustainable Cities & Towns (1994) more than 2,500 German cities have engaged in processes to formulate their Local Agendas 21. The Aalborg Charter stresses that natural capital, such as atmosphere, soil, water and forests are the limiting factors for economic development of European cities and towns. Cities and towns have committed themselves to investments in conserving the remaining natural

capital, such as groundwater stocks, soil, habitats for rare species and to encourage the growth of natural capital by reducing our level of current exploitation, such as of non-renewable energy. They also promise investments to relieve pressure on natural capital stocks by expanding cultivated natural capital, such as parks for inner-city recreation to relieve pressure on natural forests and increasing the end-use efficiency of products, such as energy-efficient buildings, and environmentally friendly urban transport.

3. FIELDS OF ACTION

Sustainable land use

Environmental concerns have to be considered by towns and cities in their spatial planning. Section 1a of the federal building code states that land shall be used sparingly and with due consideration – the law calls upon municipalities to take into account all possibilities to activate derelict land and to intensify the use of build land. The extent to which it is sealed by development shall be kept to a minimum. It further states that land-use plans shall safeguard sustainable urban development and a socially equitable utilisation of land for the general good of the community, and shall contribute to securing a more humane environment and to protecting and developing the basic condition for natural life.

In every land use plan cities have to state the implications of the planned development within a separate environmental report (*Umweltbericht*). An important mechanism is the obligation that unavoidable damage to nature that is caused by “greenfield developments” has to be compensated by investors either within the development site or within the local or regional context (*Eingriffs- und Ausgleichsregelung*). These compensation measures are often an important element of urban and regional strategies to improve the natural qualities of an area (e.g., creation of new biotopes).

PHOENIX (Dortmund)

The PHOENIX project is a good example of the revitalization of derelict land within a broader strategy of sustainable urban development. Dortmund (571,000 inhabitants), the largest city in the Ruhr area, had lost more than 80,000 jobs in coal mining, steel industry and breweries since the 1970s, but managed to build up an innovative and successful economy of industry-related service companies (engineering, IT, logistics). The conversion of former industrial sites like PHOENIX is part of this strategy of structural change and redefining the city's industrial image. PHOENIX is a former steel production site about 5 kilometres south of Dortmund's city centre. The steelworks that covered an area of 210 hectares closed in 2001. The city decided to redevelop this area as a combination of technology park, residential area and large green areas that even include a new lake. For the technology park – that is developed around two specialized business incubators – investors have to adhere to architectural standards, provide sustainable modes of transportation and connect themselves to a collective heat and power plant in order to achieve high standards in sustainability. The development of the residential area next to the waterfront of the new PHOENIX lake is very successful as it can offer natural qualities that are new to this old industrialized city. The ample green space of the area is linked to the regional park system (Emscher Park). These areas that were used industrially are now given back to nature and contribute to the quality of life of new residents and employees in the area (Hachmeyer-Ispording 2013).

Further information: <http://www.phoenixdortmund.de> (German only)

Within its national sustainability strategy (*Nationale Nachhaltigkeitsstrategie*), which was adopted in 2002, the federal government has formulated the aim to cut down land consumption for new settlements or transportation infrastructure by two-thirds until the year 2020 – the so-called 30-hectares goal. To develop the appropriate legal, financial and communication instruments, an action research programme – Research for the Reduction of Land Consumption and for Sustainable Land Management (REFINA) – was started by the federal ministry for research in 2006. Within about 50 projects throughout Germany innovative concepts for reducing land use and promoting sustainable land management were developed and implemented. This included new information and planning tools, strategies for revitalization of individual sites, conversion areas and inner-city development, and communication and awareness raising on inter-municipal planning.²

An important strategy to raise awareness for sustainable land use that was identified in the context of REFINA are the costs and follow-up costs by settlement development in relation to their profit in an urban context (Bock et al. 2009). The argument goes: if the actors involved in urban development, namely public administrators, policy makers, real estate

² See <http://www.refina-info.de>

companies and even private households, are aware about the “real costs” of different planning strategies and site selections they would arrive at planning and investing decisions that are more sustainable. Such “real costs” include higher mobility costs of suburban homeowners, ecological costs or follow-up infrastructure costs of green field developments etc. Various tools and models for cost-benefit analysis (or follow-up cost analysis) have been developed with the stated goal of creating cost transparency for residential and commercial development.

Follow-up Cost Estimator (Hamburg Region)

In order to make the best location decisions known for individual actors or even city administrations, the REFINA project “Kostentransparenz” (Cost Transparency) has developed two internet-based follow-up cost calculators. These tools, each developed for different target groups, help develop an overall picture of the actual costs that occurs from development in terms of infrastructure maintenance, transportation, along with other factors within the context of the municipality. The first of the websites (<http://www.womo-rechner.de>) provides information to individuals who are looking to take up residence in a new location, specifically within the Region of Hamburg. The tool is supposed to help individuals make the best choice when choosing a new place of residence by allowing for comparisons to be made between different locations and situations. A second website was created to provide information for politicians and city administrations, as well as the general public, about the long-term cost of building new developments from infrastructure maintenance (<http://www.was-kostet-mein-baugebiet.de>). The website offers studies on the long-term trends of development cost as well as a program to calculate the cost of development (Gutsche 2011).

Green spaces

One strategy to deal with this task of urban transformation is rebuilding underused land to strengthen compact and mixed-use city structures. But in quite a number of regions there is no need for further industrial, retail or residential space. Permanent recultivation and “green” interim use, like community gardens, are two strategies to deal with vacant land:

- *Interim uses:* New forms of development and use of vacant land that happen without a change of ownership or planning law. Interim uses avoid problematic urban blight and can open up new qualities while options for future construction are maintained. In German cities a wide spectrum of interim uses can be observed: community-organized urban gardens in building gaps in densely built Wilhelminian-style neighbourhoods, “filling” cavities in medieval city structures with art work or a field of sunflowers where buildings have been torn down in large housing estates (BBR 2004).
- *Recultivation:* This entails projects of urban transformation (*Stadtumbau*) that entail a permanent conversion of built space to green land and green space for leisure, forest use, renewable energies, flood protection or agriculture. This can entail areas with spontaneous vegetation, new forests or new parks in inner city districts (BBR 2004).

Ecology is one aspect of such “green” interim uses and recultivation projects of derelict land or brownfield sites – but often not the only one. They contribute to – academically termed – “new urban landscapes” that are multifunctional: conglomerates of traditional green space, vacant land with spontaneous vegetation and renaturalized areas. These “new urban landscapes” require other forms of design and planning – e.g., to incorporate local initiatives (Giseke 2007). Therefore recultivation is not about going back to a state of “natural landscape” that is untouched by human activities but about reinforcing both cities and landscape, about developing new qualities of such urban landscapes (BBSR 2009).

Grazing land project (Leipzig-Paunsdorf)

The grazing land project (*Beweidungsprojekt*) is part of a larger concept entailing 120 hectares of green space in Paunsdorf (20,000 inhabitants), a district of Leipzig; besides Berlin, the largest city in former East Germany (520,000 inhabitants). This neighbourhood consists of a large housing estate of prefabricated buildings typical for East Germany with poor green space, a lack of leisure facilities and an adjacent former military site. As it was too costly to denaturalize this area as a conventional public green space, it was determined to use this as grazing land for water buffaloes and wild horses. The city of Leipzig benefits from free maintenance by grazing cattle while the not-for-profit farming company profits from the free lease of public ground and from the sale of organic meat and cattle (BMVBS/BBR 2009).

Gardens in cities are nothing new in Germany: there is a long tradition of garden plots or allotment gardens (*Schrebergärten*). But urban or community gardening is a relatively new phenomenon that have broader ecological and social implications. Community gardens are cultivated by a group of people but they are open to the public – at least partially or temporarily (Rosol 2006: 51). Bringing nature back into the city and contributing to biological diversity is one aspect of community gardening. But it is also about self-sufficiency, social integration or self-organization. They can be seen as a potential model of a new post-carbon, sustainable and participative society (Müller 2010: 3). A wide array of urban and community gardening projects have developed in Germany in the last couple of years. Berlin can be seen as one of the hotspots of urban gardening.

Prinzessinnengärten (Berlin)

In summer 2009, the initiative “Nomadisch Grün” opened up Prinzessinnengärten (princess garden) in Berlin’s multi-ethnic Kreuzberg district. On a former derelict site of 6,000 square meters, which was leased from the city of Berlin, diverse vegetable and herbs are cultivated. As the lease of the land is periodically prolonged for one year only, the initiative developed a mobile garden system. It consists of recycled plastic boxes, rice bags and Tetra-Packs and containers serving as sheds for the garden equipment. This system allows the garden to be moved if necessary and allows gardening on sealed and potentially contaminated land. There is a garden café that serves home-made dishes cooked from the garden’s vegetables and herbs. The initiators of Prinzessinnengärten not only aim at developing a “productive” green space and climate-friendly ecological agriculture but also at creating a place for meetings and education for the neighbourhood (Bock et al. 2013).

Further information: <http://www.prinzessinnengarten.net>

Mitigation of climate change and energetic urban renewal

Germany’s 18 million residential buildings and 1.7 million other buildings (public, social and industrial) make up for 40 per cent of its energy consumption. About 20 per cent of CO₂ emissions stem from this area. Three-quarters of this building stock was erected before 1979 and has by modern standards, a poor energetic quality. The national goal in Germany’s energy concept (*Energiekonzept*) is to achieve a climate-neutral building stock by 2050 (BMVBS 2013). Energetic standards regarding the heating system and maximum energy consumption of new buildings and energetic requirements linked to the modernization of buildings are regulated within the Energy Saving Ordinance (*Energieeinsparverordnung*). There are funding programmes to subsidize the energetic modernization of individual buildings (presently 300 million Euro per year) (BMVBS 2012).

An important innovation in supporting the climate-friendly transformation of cities is complementing approaches to modernize individual buildings with an area-based funding and management approach. An important funding programme in this respect is “energetic urban renewal” (*Energetische Stadtsanierung*) that was started in 2011. It aims at initiating comprehensive measures in energy efficiency of buildings and infrastructure. The programme has a value of 50 million Euro in 2013. What is interesting in this programme is that it does not only finance in-depth integrated concepts to boost energy efficiency in selected neighbourhoods but also provides for human resources in the form of “urban renewal managers”. Looking at districts rather than individual buildings these integrated energy concepts identify relevant measures to reduce energy consumption and greenhouse gas emissions. Examples are energetic modernization of buildings but also opportunities for collective heating for a group of buildings and its efficient operation – often based on the use of renewable energies (e.g., combined heat and power generation plants). Other options include the use of geothermal energy (BMVBS 2013).

A successful step to boosting renewable energies is Germany's Renewable Energy Sources Act (*Erneuerbare-Energien-Gesetz, EEG*), which was adopted in the year 2000. There are two provisions in this legislation that motivate investments in renewable energies: network operators are obliged to link these power generating facilities to the grid and to purchase the electricity (*Anschluss- und Abnahmeverpflichtung*) and producers of regenerative power get a fixed price for the electricity generated. This has led to a constant increase in the share of renewables in total energy consumption, reaching almost 23 per cent in 2012 (BMU 2013).

In the city of tomorrow, the production of power and heat will be decentralized and at a smaller spatial scale than today. It will entail combined heat and power units (CHP) that are fuelled with regenerative energy sources (e.g., biogas, woodchips) and small district heating systems. Districts, housing blocks or single buildings will be autonomous producers of power and heat. Urban open spaces will be used for energy production by renewable energies. This is not only true for conversion or brownfield sites but also roofs and facades of buildings (Libbe 2012). The Internationale Building Exhibition (IBA) Hamburg has explored urban strategies for the sustainable transformation of energy provision.

Energy Bunker (Hamburg)

“City in climate change – new energies for the city” is one major strand of Hamburg's International Building Exhibition (IBA) (2006-2013). It deals with the question of how to balance the requirements of urban growth and the reduction of greenhouse gas emissions. The pilot area is Wilhelmsburg, a former working district south of the city centre. As an island in the Elbe river that has experienced dramatic flooding during the last decades, this district wants to become a pioneer for climatically friendly buildings and domestic and sustainable sources of energy. The Energy Bunker is a former flak bunker that was developed into a key component for the climate protection concept “Renewable Wilhelmsburg”. The structure, which has not been used since WWII, was equipped with a biomass combined heat and power plant, a water tank and a solar power system to generate hot water and thermal heat for dwellings in the neighbouring district. The large-scale buffer storage system with a planned total capacity of 2,000,000 litres (2,000 cubic metres) is the project's key innovation. The buffer function of the storage system will result in a significant reduction of the thermal generation capacity which must be installed, from 11 to 6.5 megawatts, facilitating the cost-effective use of renewable energies within the heat supply concept. The technological innovation will result in a CO₂ reduction of 95 per cent, equivalent to approximately 6,600 tonnes of CO₂ per year. The concept is unique worldwide and will make it possible to gather data concerning the practicability of the control and hydraulic technologies in use. The building, which was in danger of collapsing, was restored within the framework of the IBA Hamburg and preserved as a monument. As a local power plant the Energy Bunker is also an example of a decentralised energy policy creating local jobs and income (IBA Hamburg 2013).

Sustainable mobility

Germany’s cities have to prepare themselves for sustainable mobility concepts. It is an important task in cities to reduce the noise and air pollution caused by traffic and the emission of greenhouse gas. The fact that more than 50 per cent of all car trips in Germany are below a distance of five kilometres (and more than 30 per cent even below two kilometres) show that the local context is of high importance for people’s mobility (Fraunhofer IAO 2011).

One strategy is to encourage citizens to change from car to public transport and to encourage walking or bicycling. The EU has taken up this challenge and has asked cities to develop sustainable urban mobility plans (European Commission 2011). Cities can support such policies in many ways – by investing in an attractive public transport system, and attractive spaces for cyclists and pedestrians or by influencing mobility choice. Integrated mobility concepts that combine technical solutions with behavioural strategies are an important way to solve local mobility problems (Gies & Zwicker-Schwarm 2012). Various pilot projects at the city level in the context of Germany’s federal initiative to boost electro mobility have shown that this new technology has interesting potential to contribute to eco-friendly mobility in specific mobility segments (e.g., car sharing, city logistics) but that there are still legal, technological and financial obstacles to overcome (NOW 2012).

Urban planning has an important task in implementing eco-friendly mobility as settlement structures and the mix of uses are important elements: pedestrian-friendly streets and bike lanes, shopping facilities or social infrastructure within walking distance help to accomplish “a city of short distances” (*Stadt der kurzen Wege*). From a city-regional perspective, revitalization of inner city, vacant land and concentration of new settlements along stations of high-capacity rail-bound public transportation are conducive strategies that can be pursued (Beckmann 2013).

mobil.punkt – intermodal mobility stations (Bremen)

The Free Hanseatic City of Bremen (544,000 inhabitants) has developed intermodal mobility stations, so-called “mobil.punkte”. Located close to public transportation, such as light rail, they unite car-sharing services – for conventional combustion engine-driven and electric cars – bicycle stands and public transportation. Three-metre-high signature posts make these mobility points visible throughout the city. As they provide easily accessible and customer-oriented possibilities to switch modes of transport, mobil.punkte make it easy to achieve urban mobility without individual car ownership. At present there are more than 7,800 users of car sharing in Bremen using 180 cars located at 48 stations. Studies have shown that car sharing has replaced more than 2,000 cars. In a densely build city this is an important relief for public streets. To build underground parking for this amount of cars, investments of 25 to 50 million Euro would have been necessary (Glotz-Richter 2013).

Eco-Industrial Parks

Industrial sites and business parks make up for a large proportion of Germany's built-up area. In the 1980s, urban planners and ecologists developed concepts to foster industrial and business parks that consider ecological aspects with regard to site layouts that were sensitive to landscape and natural resources, efficient land use, and environmentally sensitive building materials (*Ökologische Gewerbeparks*) (Steinebach & Schaadt 1996). Outstanding examples are more than 20 business parks that were developed on the sites of abandoned coal mines and steel works in the Ruhr Area during the International Building Exhibition Emscher Park (1989-1999). Labelled "Working in the park" (*Arbeiten im Park*) the schemes for these business sites included 50 per cent of public green, and standards regarding architecture, energy efficiency and the use of renewable energies and offered a high quality of working conditions and green space for adjacent residential areas (Kilper 1999). These projects showed that environmental quality and landscape design can significantly contribute to the attractiveness and competitiveness of business sites.

Another strand of ecology in industrial sites focuses on resource efficiency and inter-firm networks material-flow management. It is based on the concept of eco-industrial parks that were developed in the 1980s in the United States, aimed at enhancing the environmental and economic performance of industrial sites through collaboration in managing environmental and resources issues, including energy water and materials (Lowe 1995, Coté & Cohen-Rosenthal 1998). In Germany, this idea was taken up in the context of optimizing existing industrial sites. More and more, cities realize that they need to upgrade the industrial sites that were developed in the last decades in terms of sustainability, including resource efficiency, joint activities in vocational training, and help with appropriate management strategies that involve companies and property owner. The first pilot projects have been carried out (Müller-Christ & Liebscher 2010, MKULNV 2010).

Zero Emission Park (Bottrop)

The industrial zone “Am Kruppwald & An der Knippenburg” in Bottrop (117,000 inhabitants), part of the Ruhr Area, was developed in the 1960s, and was in danger of becoming unattractive for companies and their workforce due to functional deficits. The city of Bottrop motivated the companies operating in this industrial zone, covering about 100 hectares, to found an association for the ecological modernization of the area. With the help of external expertise and supported within the context of a federal funding programme (*Nationale Stadtentwicklungspolitik*) they have identified strategies for a sustainable development of the area. The overall aim was to realize a “Zero Emission Park” in which the detrimental effects of economic activities on the environment are limited as far as possible. To arrive at more eco-friendly mobility patterns, public transportation services were optimized according to workers’ needs, an information pool for commuters was set up and a fleet management system was introduced. Another focus of the project is to optimize energy efficiency and to use surplus energy that is generated by the zones’ 170 companies within the industrial zone for heating an adjacent residential area (MKULNV 2010).

Further information: <http://www.zeroemissionpark.de> (German)

Integrated strategies

In many cities, the debate about sustainable development since the early 1990s, has led to the insight that ecology and environmental protection have to be conceptualized along with the social and economic perspectives. This is true at the project level but also with regard to development strategies for the entire city. This integrative approach was underlined by the Leipzig Charter on Sustainable European Cities that was formulated during the German EU presidency (2007). It states that all dimensions of sustainable development should be taken into account at the same time and with the same weight. These include economic prosperity, social balance and healthy environment. The reduction of greenhouse gas emissions and the roll-out of renewable energy are fields of action where many cities have started anew to develop integrative concepts. They cover all areas that are relevant for the climate: municipal real estate, street lighting, private households and industry, retail and services, mobility, waste water and waste (Difu 2012).

Quartier Vauban: Sustainable living for 5,300 inhabitants (Freiburg i. Br.)

Freiburg's Quartier Vauban is a good example of an urban development that includes environmental aspects within an integrative scheme. On a former military camp of the French army, the City of Freiburg i. Br. (214,000 inhabitants) developed a residential area on 38 hectares (38,000 square metres) near the city centre. It is an attractive, family-friendly neighbourhood for 5,300 inhabitants which is characterized by citizens' engagement, building in groups and environmentally conscious living. High energy standards (passive house or PlusEnergy building design) and the use of solar energy are standard for many buildings. Old trees were integrated in the planning scheme as widely as possible. Green spaces between the building blocks provide good local climate and offer ample opportunities for children's play. In line with private buildings, public infrastructure was developed: a school, kindergartens, a youth centre and community centre, a market place and leisure and playgrounds. Greened roofs retain rain water that is collected and stored. The whole residential area is practically without car traffic. Many private households live without their own cars and private vehicles are parked in two neighbourhood park garages. Since 2006, the area is served by Freiburg's light rail system. Many people use public transportation and bikes to get around (Stadt Freiburg 2013).

Further information: <http://www.stadtteilverein-vauban.de>

In German cities a new trend towards integrated urban strategies that are project and implementation-oriented can be observed that do not only entail a cross-sectoral perspective but also a broader involvement of stakeholders and citizens in policy making and implementation (Franke & Strauss 2010). The planning process usually involves a broad spectrum of civil society or businesses and is seen as a value in itself. Many cities have developed management systems that are based on sustainability indicators and combine these with aspects of New Public Management (RNE 2011). Ludwigsburg's integrative urban development concept illustrates this approach.

Chancen für Ludwigsburg – integrative urban development concept

In 2004, the city of Ludwigsburg (87,000 inhabitants) started on its way to sustainable urban development. The newly elected lord mayor aimed to transfer positive experiences from structured urban planning to all municipal fields of action and to define current and future challenges and opportunities on the basis of strength-weakness analyses. In a comprehensive process, all relevant policy themes were examined simultaneously by the administration and the municipal council – amongst them “green spaces in the city” and “renewable energy” – not only with the participation of experts, but with several conferences on the future and dialogue events involving a representative cross-section of the citizens. Strategic goals and concepts for operative measures have emerged from this process, which become a central part of administrative governance and collaboration with the municipal council, with a set of instruments of master plans and indicators. In addition to the policy fields in terms of content, the planning of the budget and the aspect of taking into account the needs of future generations are included in this comprehensive policy approach and administrative management system (Spec et al. 2010).

Further information: http://www.ludwigsburg.de/,Lde/start/stadt_buerger/stadtentwicklung.html

Innovative instruments

Urban planning, the provision of urban infrastructure or building activities by real estate companies or private households, are influenced by the legal framework and incentives, e.g., specific funding programmes. Examples are the responsibility to compensate negative environmental impacts in Germany’s Federal Building Code or funds for urban renewal or the energetic modernization of buildings. Another group of instruments focuses on information and communication. Targeted communication strategies are key to achieving environmental goals like sustainable land use at the local level (Bock et al. 2009). Here Germany has developed some distinct features:

- *International Building Exhibitions*: International Building Exhibitions (IBA) in Germany date back as far as 1901. They are much more than an architectural exhibition; dealing with social, economic and ecological aspects and the quality of planning process and citizens’ participation (Durth 2009). As the examples in this article show, they were also important with regard to ecological issues. IBA Berlin 1987 promoted “cautious” urban renewal (*behutsame Stadterneuerung*) that focused on repair and reconstruction of cities, participation and the maintenance of social structures. IBA Emscher Park (1999) focused on the transformation of parts of the old industrialized Ruhr Area and contributed to the development of eco-industrial parks. For IBA Hamburg (2007-2013) local strategies to develop sustainable urban structures that contribute to the mitigation of climate change are a key topic.

- *Intermunicipal competitions:* Competitions between cities and regions are increasingly used by federal and state governments for agenda setting, support of local policy development and dissemination of “best practice” (Benz 2004). This is also true for ecological aspects of urban development. At the federal level, the ministry for the environment started in 2009, an annual municipal competition for climate protection, and since 2012, there is a National Sustainability Award for Cities and Towns and various environmental organizations have also invited tenders to elect Germany’s “federal capital for nature protection” or “climate capital”.
- *Action research:* The Federal government is funding action research that brings together academia, planners and municipalities to develop innovative concepts and measures on critical issues of urban development – like sustainable land use (see REFINA program above), adaptation of cities and regions to climate change or the introduction of electric mobility. Important programmes include “Experimental Housing and Town Planning” (Experimenteller Wohnungs- und Städtebau, ExWoSt) and “Model Projects of Regional Planning” (Modellvorhaben der Raumordnung, MORO). The results of these experimental formats contribute to federal and local policy development and the transfer of “best practice” in urban and regional development.³
- *Certification of sustainable urban districts:* In the last few years, systems to certify sustainable buildings have been developed in the US (e.g., Leadership in Energy & Environmental Design, LEED) and United Kingdom (e.g., Building Research Establishment Environmental Assessment, BREEAM). In Germany, the Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB) – a non-profit and non-governmental association that was established in 2007 – has developed a comprehensive certification system for “green buildings”. In 2012, this was complemented by a DGNB certification for sustainable urban districts – mainly focused on “new” developments, i.e., large-scale urban projects. It takes the following fields into account: environmental, economic, sociocultural and functional, technical as well as process quality, broken down into 45 criteria. Fifteen urban districts were included in the development of this certificate (Grassl 2012). DGNB argues that certification systems can have different functions in supporting eco-friendly and sustainable buildings and urban planning: as communication and planning instrument (especially for large projects with many stakeholders), as instruments that ensure the quality of a project and as a marketing tool.

4. CONCLUSION

Environmental and ecological aspects are part of the legal framework and financial programs that frame urban development in Germany. They are more and more part of integrated strategies in which cities try to tackle the transformation to meet the needs of demographic change, the knowledge economy, a post-oil energy system and adaptation to climate change. This article has shown various innovative examples of how local actors contribute to eco-friendly

³ Further information: <http://bbsr.bund.de>

urban development. Urban development in Germany does not focus on large-scale greenfield projects for “eco cities” but tries to accomplish steps to transform existing settlement structures into more eco-friendly cities. But there is still some way to go. Sustainable land use, air quality, sustainable mobility or biodiversity are fields of action where benchmarks that were set out Germany’s National Sustainability Strategy are still missed by many (RNE 2008).

Looking at the ecological and environmental aspects of urban development two aspects seem to be worthwhile extensions for future research and implementation:

- *Civic participation:* Despite formal requirements for public participation in urban planning and various experimental formats for citizens’ involvement in urban development and planning, various protest against large urban projects – for example in the case of a new underground railway station in Stuttgart (“Stuttgart 21”) in which ecological aspects played an important part – have shown the need to think of new ways to organize civic participation (Bock & Beckmann 2013).
- *Fair environmental conditions:* Environmental planning has to incorporate the social dimension. People with low income and low educational level are more likely to be exposed to higher health risks resulting from environmental problems than those of a better social status; for example, as they tend to live in urban areas with high volumes of traffic. It is therefore important that cities develop strategies to reduce socially unequal distribution of health-related environmental burdens and benefits – e.g., in providing public green or measures to improve noise protection (Böhme et al. 2013).

What can be learned from Germany? Despite all the differences in framework conditions and institutional settings, some conclusions can be drawn:

- *Strategies for urban transformation:* The examples given in this article illustrate that German cities have developed strategies and invested in urban projects to master dramatic structural changes in population and economic activities and their consequences on urban structures and urban life – in old industrialized areas like the Ruhr area or in former East Germany. Urban transformation often resulted in a “double strategy” that brought new functions *and* new urban landscapes where industrial brownfields or vacant housing estates once stood (Selle 2005). The multitude of “green” projects that was developed is worthwhile exploring as are the integrative concepts and planning strategies. Currently, efforts to mitigate climate change and to adapt to climate change mark a new wave of urban transformation which is still in an experimental phase.
- *Policy mix:* There is the need for an effective legal framework that forces local actors – municipalities, businesses, and private households – to include environmental aspects in their planning and investment decisions. Action research, e.g., in the field of sustainable land use, has shown that an effective instrumental mix is needed that combines an improved legal framework with adequate financial incentives and targeted strategies for communication and management (Preuß & Ferber 2008).
- *Local self-administration:* Compared to many other European countries, German municipalities have wide competencies, and own the financial and administrative resources to plan and pursue their specific pathways to eco-friendly and sustainable

urban development. This leads to a multitude of ideas and “best practices” that is demonstrated in inter-municipal competitions. Many cities claim themselves as “environmentally friendly” or “green” cities and link economic development to issues of sustainable development (e.g., Freiburg i. Br.).

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The Transition towards Sustainable Cities: The Dutch Experiences

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The transition towards sustainable cities is an important prerequisite for assuring the liveability of the planet for future generations. According to current prognoses, by 2050, approximately 75% of the world population will live in and around major metropolitan areas. In order to guarantee healthy urban living, a rethink of the existing production and consumption patterns is needed. The growing population living in cities will use more energy, water and other resources, produce more waste and contribute to increasing urban mobility. This will aggravate pollution problems, congestion and socio-economic tensions. Therefore, there is a need to redirect the present systems and structures in a more sustainable direction.

This challenge can also lead to promising opportunities, as stated by Green Media: “Cities present the world’s population with the best chance of reducing our ecological footprint. Urban areas are uniquely positioned to lead the greening of the global economy through improvements in transport, energy, buildings, technology, water and waste systems, as well as producing a wide range of economic and social benefits. To achieve this, existing and new-build cities will have to adopt sustainable development strategies, including efficiency gains, innovative infrastructures and technological advancements in order to meet the demands of this rapidly growing urban population”².

This article will reflect upon the experiences in Europe, particularly in the Netherlands, of transcending towards sustainable cities. First, EU policies geared towards energy and resource efficiency in the built environment will be discussed in general. Second, the stage of implementation of these policies will be analysed. To be more specific about the constraints and opportunities, the analysis will focus on the Dutch experiences in making the transition towards sustainable cities. Finally, the article concludes that the pursuit of sustainable cities requires tailor-made national government policies and an active involvement of industry and citizens. Moreover, new financial and organisational arrangements should be agreed upon to optimise the costs and benefits proportionally for all those involved.

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² Green media, Sustainable Cities; Building Cities for the Future, London, June 2012.

EUROPEAN POLICIES AND PRACTICES

The European Union comprises about 400 million people, of which 80% already live in urban areas. Many of the cities in Europe have a rich historical and cultural heritage, which adapted to the social and economic needs of their inhabitants. The EU sees cities as “places to live, work and play, as centres of economic, commercial and administrative activity, as focal points of culture and education, and as tourist sites, many – often conflicting – demands are placed on Europe’s cities”³.

At present, European cities are confronted with a number of problems which threaten their liveability. Mobility in cities is problematic: the air pollution leads to health problems and the congestion to chaotic traffic jams. The city environment is also impacted by soil, air and water pollution caused by all kinds of human activities. Due to climate change, cities have to cope with heat stress, water scarcity and flooding. Moreover, climate mitigation measures are necessary to help reduce energy use and CO₂ emissions, as well as install renewable energy. The growing scarcity of resources also increases the urgency to adopt innovative, sustainable alternatives for waste management. More attention should be paid to the reuse and recycling of products and materials based on the principles of a circular economy. Finally, cities need to be pleasant places to live, work and recreate in. Therefore, the greening of cities is a major issue as well.

Despite all the potential threats, urbanisation may also lead to opportunities. A transformation towards more sustainable cities can enhance their liveability and hence their attractiveness for business and citizens. This can lead to more economic prosperity, more social cohesion and a healthier environment.

For European cities, the major challenge is to cope with the transformation of existing cities. In other parts of the world, particularly in rapidly growing economies, the primary focus is on building new cities. This implies that the transformation of European cities has its own specific characteristics. Existing systems and structures need to evolve in a more sustainable direction. Within Europe, all member states follow their own development paths. However, a number of measures which affect cities are decided at the EU level.

EU policies cover a wide range of initiatives and regulations to support the transition towards sustainable cities. First, the EU has formulated a great number of regulations (e.g., on air and water quality) to guarantee acceptable health standards in cities. Furthermore, the EU has developed policies geared towards energy and resource efficiency in the built environment. In particular, energy efficiency policies are well on the way.

For new buildings, regulation is adopted to gradually transcend to energy-neutral in 2020. However, the greatest challenge to making the transition towards sustainable cities in Europe is the deep retrofit of *existing* buildings – as they are far in the majority. The report “Europe’s Buildings under the Microscope” states that the residential building stock is about 75% of the overall stock. More than 40% thereof had been constructed before the 1960s, during a time when no attention was paid to energy efficiency. Boosting the deep retrofit of

³ <http://www.inforegio.cec.eu.int/urban/forum/src/frame3.htm>

this stock would upgrade the energy efficiency of existing buildings tremendously. However, in practice this ambition is hard to realise because 80% of the residential stock is held in private ownership. Political support for enforcing strict energy-efficiency regulations on these private owners is lacking. Seducing this latter group to take action themselves is not easy either due to lack of awareness and information, split incentives or financial, institutional and administrative barriers⁴.

The main instrument to promote energy efficiency of the built environment is the implementation of the Energy Performance of Buildings Directive⁵. This directive requires certification, inspections, training and renovation. The Energy Performance Coefficient (EPC) schemes are in place, but are often not fully implemented. The energy building requirements for the thermal performance of “building envelopes” have been applied differently among member states. The EPBD recast of 2010 added a gradual convergence to nearly zero energy standards, which are comparable to the earlier adopted requirements for new buildings from 2020⁶.

For an effective approach to improving the energy performance of buildings, financial instruments are indispensable. However, while there are many financial programmes in place in EU member states, the understanding of their overall effectiveness is unclear. Relevant information on the evaluation of different programmes is often hard to collect and even harder to compare⁷. A review of the financial instruments used in the EU concludes that the level of ambition of financial programmes needs to rise in order to have a greater impact and unlock further private investment for deeper renovation. Funding a major retrofit strategy will require the bundling of several financial instruments because of the up-front cost of a deep retrofit⁸.

Besides the specific EU policies mentioned earlier, numerous R&D and innovation programmes have been set up since the 1990s to stimulate more sustainable practices in urban regions. Moreover, European cities joined forces to share experiences and build a Sustainable City community.

For instance, a great number of European cities participated in the International Council for Local Environmental Initiatives (ICLEI), launched in 1990. This is an association of local governments dedicated to the prevention and pursuit of solutions to local, regional and global

⁴ Economidou, M. et al., *Europe’s Buildings under the Microscope, A Country-by-Country Review of the Energy Performance of Europe’s Buildings*, Buildings Performance Institute Europe (BPIE), Bruxelles 2011.

⁵ EC of the European Parliament and of the Council, Directive 2002/91 on the energy performance of buildings, Bruxelles, 16 December 2002 and Recast 18 May 2010.

⁶ Economidou, M. et al., *Europe’s Buildings under the Microscope, A Country-by-Country Review of the Energy Performance of Europe’s Buildings*, Buildings Performance Institute Europe (BPIE), Bruxelles 2011.

⁷ Economidou, M. et al., *Europe’s Buildings under the Microscope, A Country-by-Country Review of the Energy Performance of Europe’s Buildings*, Buildings Performance Institute Europe (BPIE), Bruxelles 2011.

⁸ Maio, J. et al., *Energy Efficiency Policies in Buildings, The Use of Financial Instruments*, Buildings Performance Institute Europe (BPIE), Bruxelles 2012.

environmental problems through local action. Over 300 cities, towns, counties and associations from around the world are members of the Council⁹.

In 1994, the European Sustainable Cities & Towns Campaign was launched by the EU Environment Commissioner at the First European Conference on Sustainable Cities & Towns in Aalborg, Denmark, and initiated by 80 European local authorities signing the Charter of European Cities & Towns towards Sustainability¹⁰. The objective of the campaign is to encourage and support cities, towns and counties in working towards sustainability and to promote development towards sustainability at the local level through Local Agenda 21 Processes in accordance with the mandate given to local authorities by Agenda 21 as agreed at the Earth Summit in Rio de Janeiro in 1992¹¹.

In the late 1990s, the Sustainable Cities Project was launched within the framework of the implementation of the Community's Fifth Environmental Action Programme (1998-2002). The aim of this project was to promote new ideas on sustainability in European urban settings, foster a wide exchange of experience, disseminate good practices on sustainability at the urban level and formulate recommendations for EU institutions, national, regional and local authorities¹².

This large Sustainable City project was followed by many more projects and programmes, financed by the Sixth and Seventh EU Framework Programmes since 2003. Through these EU programmes and national programmes a great number of initiatives were taken to make EU cities more sustainable. Websites like sustainablecities.eu and sustainablecitiescollective.com report on the content and progress of sustainable urban development and present showcases. These websites show that technically, a lot of progress in developing more sustainable products, buildings and services in EU cities has been made. However, the greatest challenge will be to make the transition towards developing complete neighbourhoods and cities in a sustainable manner. This requires an integrated approach, which transcends stand-alone innovations and pilots, presently the main focus of attention. Therefore, the next step is to scale up the pilots and set up large-scale, integrated programmes at neighbourhood and city levels. However, mainstreaming the present showcases at the system level is not just about multiplying the good examples. It requires new structures and new roles of the actors involved. It needs new forms of cooperation between participating companies, government, end-users and knowledge institutes. Moreover, new financial arrangements need to be agreed upon which optimise the costs and benefits proportionally for all those involved. On the basis of Dutch examples, the constraints and opportunities for a transition towards sustainable cities will be discussed in more detail. Special attention will be paid to innovative policy solutions. It will be questioned what a compatible policy environment which enables bottom-up approaches and a greater involvement of the local community looks like.

⁹ <http://www.iclei.org>.

¹⁰ Aalborg Charter of European Cities & Towns Towards Sustainability. As approved by the participants at the first European Conference on Sustainable Cities & Towns in Aalborg, Denmark on 27 May 1994.

¹¹ <http://euronet.uwe.ac.uk/eurosustcit/campaign.htm>

¹² <http://ec.europa.eu>

DUTCH EXPERIENCES

In the Netherlands, much experience has been gained in shifting towards more sustainable housing and transport. It is able to build a house which produces instead of consumes energy. It uses traditional water bins to collect rainwater, and – in combination with smart water systems – is able to use this water efficiently. It has introduced electric vehicles and put in place the first charging points. It is also famous for its cycling practices in cities. However, most of these efforts are “stand-alone” innovations. In order to make bigger steps forward, it needs to move from exciting pilots to large-scale initiatives. This scaling up requires integral urban development with sustainability as a unifying concept.

Sustainable urban development is an ambitious target. It implies the development of a new building area by taking into account sustainability from the very beginning: from the design phase to the phases of production, building, managing, demolishing and bringing the resources back into the cycle. This requires cooperation between all actors in the chain, even the ones that pull down the buildings. An example of such an initiative is “Circle City” in Rotterdam. A social housing corporation, a demolition firm, a cement producer and the municipal cleaning department joined forces and were able to close the loop of building materials. After the demolition, the building materials were reused in the construction of new buildings. It did not only benefit the environment but also led to the employment of people who were previously jobless for a sustained period in time. The author, as the virtual mayor of Circle City, is a big promoter of this initiative.

An integral approach also means that activities in the subsoil should be well attuned to building activities at the surface level. A good example is the big renovation of the Central Station area in Utrecht, the city where our Utrecht Sustainability Institute is located. This project, in which quite a number of the institute’s researchers participate, involves the complete renovation of the central station and surrounding area with offices, a shopping mall and housing. Moreover, in order to clean the ground water of the subsoil biologically, an innovative so-called bio-washing machine was installed. The biological cleaning is accelerated by increasing the circulation and temperature of the ground water through the combination of a large Aquifer Thermal Energy Storage (ATES) system. This ATES system stores the heat produced in the summer in the groundwater and uses it to heat buildings in the winter. Similarly, the cold produced in the winter is used to provide air-conditioning in summer. Of course, this large-scale ATES energy system should be used efficiently. What is being developed at the surface level in terms of housing, shops and office buildings should therefore be coordinated well with all these activities in the subsoil.

The Dutch “City of the Sun” in Heerhugowaard, a neighbourhood powered by solar energy, shows that new technology should go hand-in-hand with the proper use of this technology. Fluctuations in solar energy supply can easily be moderated by smart grids. However, consumers have to be informed and be able to use those advanced systems properly. The same holds for the innovative water systems called “wadi’s” in Leidsche Rijn. Through intelligent drainage systems in the subsoil and trenches at the surface level, rainwater is not conveyed via the sewage system, but collected, biologically treated and reused as grey water. This only

works well when citizens in this neighbourhood understand the system and, for instance, do not wash their cars in the wrong place.

Thus, the integration of sustainability in urban development implies not only attuning the activities of various business partners in new building and renovation, but also involving end-users in the process as early as possible. Together with all partners in the building sector and end-users, new organisational structures have to be put in place for joint responsibility of the overall design, building and maintenance of the urban (re)development. By taking shared responsibility, failure costs decrease and more coherence is created in the building process and maintenance phase. A joint approach also offers opportunities for new arrangements to finance sustainable building projects. An example thereof is Energy Service Companies (ESCOs), which have been established to finance the installation of new energy systems. This can vary from LED street lighting to ATES systems or an insulation programme of apartment blocks. A consortium of companies (including building companies, pipefitters, financial institutions, lawyers, consultants and/or energy companies) provides the service of such renovations. The essence is that the ESCO as a consortium invests in energy measures, gets paid back by the end-users in a specified time span of, for instance, five to fifteen years, and guarantees a specified performance and maintenance level.

Another way to arrange the finances for new energy systems is via energy cooperatives that are mushrooming all over the Netherlands. Citizens invest collectively in energy cooperatives through buying bonds, certificates or other means. This joint ownership promotes active partnership in the design and decision-making of new energy systems, e.g., wind turbines. Experiences show that through active citizens' participation, new technologies are adopted more easily and with more enthusiasm.

What is the added value of sustainable urban development from this integral perspective? First of all, it improves the efficiency of the building process and can lead to enormous cost savings through, for instance, less failure costs and less double work. Second, the societal merit is higher due to the acceptance of responsibility over the whole lifecycle of the buildings, which may lead to higher achievements in terms of sustainability. The urban development is designed for disassembly and reuse of materials in a "Cradle to Cradle" design. And finally, it is to be expected that the active involvement of the local community will lead to broader societal support for the renovation process.

ACTIVE INVOLVEMENT OF THE LOCAL COMMUNITY

Active involvement of citizens is an important prerequisite for making the transition towards sustainable cities. However, there are many obstacles to mobilising citizens. Surveys usually show that citizens are quite concerned about the environment. However, when asked who should take the lead in taking action, citizens often point to the government and industry. The citizens will follow their lead, it is usually stated. In practice, however, the latter is not automatically the case. Citizens tend to refrain from action for two main reasons. The first reason is the prisoner's dilemma. Citizens tend to argue: Why should I act when my neighbour is not doing so? My contribution to the environment is just a drop in the ocean.

A second reason is the ingrained behaviour of citizens. Changing consumer behaviour is hampered by the daily routine in which citizens act and do things. In this context, the book by Nobel Prize winner and psychologist Daniel Kahneman, *Thinking, Fast and Slow*, is illustrative¹³. He explains people's behaviour through the metaphor of the two systems of the brain. System 1 is fast, intuitive and emotional, while System 2 is slower, more deliberative and more logical. Most of people's behaviour is based on fast thinking, he argues. People judge and decide intuitively. What is needed is to trigger a way to engage System 2 into thinking about a person's habits in a more deliberate way. Only when one is able to tap more into the benefits of slow thinking would one be able to position oneself better to reflect on why one does things in a certain way and rethink one's behaviour.

To overcome the two obstacles mentioned earlier, new, more collective approaches have been adopted in the Netherlands. For example, the so-called "Climate street party" campaign was set up to encourage citizens to save energy and install renewable energy systems on their roofs. A great number of streets in the Netherlands were competing with each other to determine which street would reduce CO₂ emissions most effectively in a year's time. The winner of that year would be rewarded with a celebration in the neighbourhood, the presence of the Minister of the Environment during the festivities and a small present. The campaign was a big success. Neighbours helped each other and new habits were easily adopted through collective action. It showed that the prisoner's dilemma and ingrained habits could be overcome. People were willing to change habits and take action collectively.

Based on this philosophy, new forms of citizens' involvement have been developed in the Netherlands. For instance, a civil organisation called Urgenda purchased a huge number of solar panels and encouraged citizens to buy them via a collective bargain. It was a great success. Before the solar panels arrived at the harbour of Amsterdam, the subscription to these panels was fully booked. Another example is an initiative called Nudge. Via a small "nudge", people trigger other people to join a sustainability action in their own neighbourhood or in a particular product chain or new service. This can be the development of a collective neighbourhood garden, a renewable energy initiative or an action to improve the sustainability of a product or service. The organisation connects people via the internet website and facilitates actions that pop up somewhere in the Netherlands. In three years, the number of active Nudgers has increased to over 30,000 people. It is becoming a real virtual community.

The examples explain how the two obstacles mentioned above can be overcome. Through collective action and reciprocity people did not experience a prisoner's dilemma. Moreover, due to the inspiring approach of both initiatives, citizens were triggered to reflect upon their own way of acting and doing things and adopt slow (System 2) thinking.

All these bottom-up initiatives have triggered the active involvement of citizens and raised the awareness that their actions matter. Of course, such bottom-up activities often have to be complemented by top-down measures taken by the government. In the case of the implementation of renewable energy or new recycling schemes, for example, existing legislation has to be adapted or renewed. In some cases, the government also has to force new

¹³ Kahneman, D., *Thinking, Fast and Slow*, Penguin, London, 2011.

technology to replace outdated technology. For example, as the Minister of Housing, Spatial Planning and Environment, the author initiated the phase-out of the traditional incandescent light bulb. The lighting sector had tried for many years to increase the sale of more energy-efficient lighting, but did not succeed because of the reluctance of consumers. Therefore, the author took the initiative for a phase-out, invited the lighting sector to join in and convinced her colleague ministers of other EU member states to support her initiative. This led to a phase-out of the incandescent light bulb in the whole EU and the rapid market introduction of LED. This particular type of technology-forcing measure was at first not popular among consumers, but in the course of time people accepted the change. However, a government always has to take into account that such decisions might undermine support for the overall sustainability programme.

When citizens are willing to join energy-efficiency programmes, it is of utmost importance to manage their expectations in a thoughtful manner. Experiences show that an improvement of, for instance, two energy label steps will not automatically lead to a certain decrease of the energy bill. It is very much dependent on the specific use made by the consumer and how much energy reduction is realised in practice. For instance, a family with three teenagers will have a completely different energy use than a bachelor eating out many days per week. Therefore, communication about the reduction in energy costs as a result of energy efficiency measures should be tailor-made. In the Netherlands, the country is presently developing means to give consumers customised advice about the costs and benefits of the various energy-efficiency measures. Specific user profiles are formulated which reflect the energy behaviour of different target groups. In this way, promises about potential energy savings are underpinned by real data. This takes away a lot of distrust among consumers about the expected cost reductions.

CONSEQUENCES FOR THE ACTORS INVOLVED

It is clear from the examples that cooperation is necessary between all actors involved in urban development: knowledge institutes, industry, the financial sector, citizens' groups and the government (both at the national and local levels). What does this mean for the roles of the different actors? What are they supposed to do?

Knowledge institutes need to provide the expertise. They can not only develop innovative, new technologies but also support the transition process via knowledge about the economic, social and governance aspects.

The role of industry is crucial. The various companies involved in the overall urban development project should cooperate, join forces, co-create together and take responsibility for the whole lifecycle. This requires guts, tight control and cooperation in clusters of companies. Such an ambitious approach can only be realised successfully if all parties involved trust each other and acknowledge the added value of close cooperation. It also implies new financial arrangements, in which costs and benefits are divided proportionally. The financial sector and legal advisors should support the new organisational and financial arrangements developed. In practice, however, these new deals are hard to get off the ground; especially in times of

economic turmoil and reorientation of the banking sector after the financial crisis, when banks, pension funds and other financial institutions are reluctant to buy in. Therefore, quite some effort is presently put into creating innovative models of financing.

Citizens' or end-users' involvement is crucial as well. Instead of being an observer, they become participants in the process. This can be particularly enhanced through a collective action approach in which citizens or end-users join forces to get things off the ground. As a result, they feel more engaged and are willing to accept the new technology. Societal support for making the transition towards sustainable cities can be increased as well.

What about the role of the government? Due to the financial and economic crisis, the Dutch government (as well as other EU countries) are hesitant to take financial risks. Therefore, on the one hand, limited financial budgets do not allow high investments in new urban development. On the other hand, it is evident that employment increases through public investments in infrastructure, housing, etc. One of the solutions to cope with this dilemma is to join forces and become more efficient economically and ecologically. The government can support the building sector in fulfilling this mission.

The government can remove barriers (e.g., legal or institutional barriers), guarantee a level playing field and promote creativity and innovation. It can also include sustainability in procurement requirements, while leaving room for the market to put in place the "right" measures. And finally, the government can help to make sure that the execution of the overall, integral project is in the hands of a strong project team with a robust mandate. All these measures are attuned to the specific local or national context and are therefore tailor-made.

CONCLUSION

Sustainable urban development offers opportunities and societal merits. In order to achieve these advantages, a mind shift and adopting different ways of cooperation are necessary among all actors involved: those in the building sector, finance, government, civil society and in knowledge institutes. Triggered by both the current economic and environmental crises, the awareness among those involved of the need to change course is increasing. By combining the challenge of being more efficient economically and tackling the sustainability problem, new innovative projects can get off the ground in the Netherlands. Only by keeping up this positive spirit and showing leadership can the country make the transition towards sustainable cities. And that is what is essential in its quest to leave behind a liveable planet for future generations!



EU-ASIA DIALOGUE

*Shaping a Common Future for Europe and Asia –
Sharing Policy Innovation and Best Practices in Addressing Common Challenges*

The “EU-Asia Dialogue”-project is a joint project by the European Commission and the Konrad-Adenauer-Stiftung of Germany.

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